TRINIDAD AND TOBAGO

NATIONAL DISASTER PREPAREDNESS BASELINE ASSESSMENT

A DATA-DRIVEN TOOL FOR ASSESSING RISK AND BUILDING LASTING RESILIENCE

PDC | GLOBAL

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- Caribbean Natural Resources Institute (CANARI)
- Central Statistics Office (CSO)
- Eco Industrial Development Company of Tobago (E-IDCOT)
- Environmental Management Authority (EMA)
- Ministry of Agriculture, Land and Fisheries
- Ministry of Communications
- Ministry of Education
- Ministry of Foreign and CARICOM Affairs
- Ministry of Health
- Ministry of Rural Development and Local Government (MRDLG)
- Port of Spain City Corporation Disaster Management Unit (PSCCDMU)
- Telecommunications Authority of Trinidad and Tobago (TATT)
- Tobago Emergency Management Agency (TEMA)
- Trinidad and Tobago Electricity Commission (TTEC)
- UNDP/UNETT Joint Office Trinidad and Tobago
- University of the West Indies Seismic Research Centre (UWI-SRC)

LIST OF ACRONYMS

2G/3G/4G – xth generation in mobile network technology

AAR – After-Action Report

ACTT – [Climate] Action by Civil society in Trinidad and Tobago

ADRA-IAD – Adventist Development and Relief Agency Inter-American Division

AMCHAM T&T – American Chamber of Commerce of Trinidad and Tobago

AMP – Advanced Medical Post

ARISE – Alliance for Disaster Resilience

ATTIC – Association of Trinidad and Tobago Insurance Companies

BCM – Business Continuity Management

BCP – Business Continuity Planning/Plan

CAF – Corporacion Andina de Fomento / Development Bank of Latin America

CAIC – Caribbean Association of Industry and Commerce

CANARI – Caribbean Natural Resources Institute

CARICOM – Caribbean Community

CBO – Community-Based Organization

CC – Coping Capacity or Climate Change

CCA – Climate Change Adaptation or Action

CCDRM – Canada-Caribbean Disaster Risk Management (Fund)

CCRIF – Caribbean Catastrophe Risk Insurance Facility

CDAC – CARICOM Damage Assessment and Coordination (Team)

CDB – Caribbean Development Bank

CDEMA – Caribbean Disaster Emergency Management Agency

CDM – Comprehensive Disaster Management

CDMPF – Comprehensive Disaster Policy Framework

CDRMP – Caribbean Disaster Risk Management Program

CDRT – Community Disaster Response Kits

CDRU – CARICOM Disaster Relief Unit

CEO – Chief Executive Officer

CERT – Community Emergency Response Team

CIDA – Canadian International Development Agency

COG – Continuity of Government

CONOPS – Concept of Operations

COOP – Continuity of Operations

COP – Common Operating Picture

CORE – Communities Organized and Ready for Emergencies

COST – CARICOM Operations Support Team

COVID-19 – Corona Virus Disease 2019

CSO – Civil Society Organization or Central Statistical Office

CSS – Combat Service Support

LIST OF ACRONYMS

CWP – Country Work Programme

CYEN-TT – Caribbean Youth Environment Network Trinidad and Tobago Chapter

CZM – Coastal Zone Management

DALA – Damage and Loss Assessment

DANA – Damage and Needs Assessment

DAP – Document Architecture Process

DM – Disaster Management

DMA – Disaster Management Analysis

DMU – Disaster Management Unit

DRM – Disaster Risk Management

DRR – Disaster Risk Reduction

DRU – Disaster Relief Unit

EAS – Emergency Alert System

E-IDCOT – Eco Industrial Development Company of Tobago

EMA – Environmental Management Agency

EMATT – Emergency Association of Trinidad and Tobago

EOC – Emergency Operations Center

EOP – Emergency Operations Plan

EPOSDC – East Port of Spain Development Company

ERG – Emergency Relief Grant (of CDB)

ESF – Emergency Support Function

ET – Environment Tobago

EU – European Union

EWS – Early Warning System

FAO – Food and Agriculture Organization (of the United Nations)

FBO – Faith-Based Organization

FD – Fire Department

FEEL – Foundation for the Enhancement and Enrichment of Life

FEMA – (United States) Federal Emergency Management Agency

FONDEM – Fondo Interamericano de Ayuda de Emergencia/ Inter-American Emergency Aid Fund

FSSC – Financial Sub-Sector Committee

FY – Fiscal Year

GFDRR – Global Facility for Disaster Risk Reduction and Recovery (of World Bank Group)

GIF – Green Energy Fund

GIS – Geographic Information Systems

GISL – Government Information Services Limited

GoRTT – Government of the Republic of Trinidad and Tobago

HADR – Humanitarian Assistance and Disaster Relief

HAZMAT – Hazardous Materials

HCS – Home Construction Subsidy

HFA – Hyogo Framework for Action

LIST OF ACRONYMS

HIG – Home Improvement Grant Program

HIS – Home Improvement Subsidy

HOC – Humanitarian Operations Center

HSF – Heritage and Stabilization Fund

HVIP – Housing and Village Improvement Program

HWA – House Wiring Assistance

IA – Insurance Act

IADB – Inter-American Development Bank (See also IDB)

IBRD – International Bank for Reconstruction and Development (of World Bank Group)

ICS – Incident Command System

IDA – International Development Association (of World Bank Group) or Initial Damage Assessment

IDB – Inter-American Development Bank (See also IADB)

IFRCS – International Federation of the Red Cross and Red Crescent Societies

IGOPP – Index of Governance and Public Policy

INACTT – Is There Not a Cause

IOC – Intergovernmental Oceanographic Commission

IRL – Immediate Response Loan (of CDB)

ISO – International Organization for Standardization

K-12 – from Kindergarten to 12th grade

LSA – Land Settlement Agency (of MHUD)

MALF – Ministry of Agriculture, Land, and Fisheries

MC – Municipal Corporation

MDA – Ministry, Department, or Agency

MEOC – Municipal Emergency Operations Centre

MHRA – Minor House Repair Assistance

MHUD – Ministry of Housing and Urban Development

MNS – Ministry of National Security

MOA – Memorandum of Agreement

MOF – Ministry of Finance

MOH – Ministry of Health

MOPD – See MSPD

MPSD – Ministry of Planning and Sustainable Development (formerly Ministry of Planning and Development – MOPD)

MoTEST – Ministry of Tertiary Education and Skills Training

MOU – Memorandum of Understanding

MOWT or MWOT – Ministry of Works and Transport

MPU – Mitigation and Planning Unit (within ODPM)

MRDLG – Ministry of Rural Development and Local Government

MSCD – Ministry of Sport and Community Development

MSDFS – Ministry of Social Development and Family Services (formerly Ministry of Peoples and Social Development - MOPSD)

LIST OF ACRONYMS

MSPD – Ministry of Planning and Sustainable Development

MTPF – Medium-Term Policy Framework

NAS – National Alert System

NDMC – National Disaster Management Committee

NDO – National Disaster Office

NDPBA – National Disaster Preparedness Baseline Assessment

NDRF – National Disaster Relief Fund

NDRRC – National Disaster Risk Reduction Committee

NEBS – National Emergency Broadcast System

NECC – National Emergency Command Centre

NECP – National Emergency Communications Plan

NEED – National Emergency Exercise Day

NEOC – National Emergency Operations Centre

NEMA – National Emergency Management Agency

NGO – Non-Governmental Organization

NHMP – National Hazard Mitigation Plan

NICA – National Institutional and Capacity Assessment

NICT – National Information Communication Technology [Plan]

NIMS – National Incident Management System

NOAA – National Oceanic and Atmospheric Agency (of the US) (see also US NOAA)

NOSCP – National Oil Spill Contingency Plan

NREP – National Radiation Emergency Plan

NRF – National Response Framework

NSDP – National Social Development Programme (of MSDFS)

NSITT – National Statistical Institute of Trinidad and Tobago

NSTA – National Security Training Academy

NTA – National Training Agency

NWS – National Weather Service (of the US NOAA)

OAS – Organization of American States

OCHA – Office for the Coordination of Humanitarian Affairs (of the United Nations) (see also UNOCHA)

ODPM – Office of Disaster Preparedness and Management

ODPMTT – Office of Disaster Preparedness and Management Trinidad and Tobago (Facebook name)

PAHO – Pan-American Health Organization

PBC – Project Board Committee

PDC – Pacific Disaster Center

PIO – Public Information Officer

PPE – Personal Protective Equipment

PPP – Public-Private Partnership

PSCCDMU – Port of Spain Disaster Management Unit

PTWC – Pacific Tsunami Warning Center

LIST OF ACRONYMS

RCC – Regional Coordination Center

R**&**D – Research and Development

REACT – Radio Emergency Associated Communications Team

RNAT – Rapid Needs Assessment Team

RRL – Rehabilitation and Reconstruction Loan (of CDB)

RRM – Regional Response Mechanism (of CDEMA)

RSART – Regional Search and Rescue Team (of CDEMA)

RSS – Regional Security System (of CDEMA)

SAR or S&R – Search and Rescue

SAUTT – Special Anti-Crime Unit of Trinidad and Tobago

SD – Sustainable Development

SDG – Sustainable Development Goal

SFDRR – Sendai Framework for Disaster Risk Reduction

SME – Small and Medium-sized Enterprise

SMS – Short Message Service (i.e., text message)

SOP – Standard Operations (or Operating) Procedure

SOUTHCOM – Southern Command (of the U.S.) or USSOUTHCOM

SPA – Sanitary Plumbing Assistance

SPC – Segregated Portfolio Company (related to CCRIF)

SRFP – Sub-Regional Focal Point (of CDEMA)

S&T – Science and Technology

SWG – Sector Work Group

TAC – Technical Advisory Committee

TATT – Telecommunications Authority of Trinidad and Tobago

TCOSWAF – Tobago Cold Storage and Warehouse Facility

TEMA – Tobago Emergency Management Agency

TEOC – Tobago Emergency Operations Centre

THA – Tobago House of Assembly

TSTT – Telecommunications Service of Trinidad and Tobago

T&T or TT or TTO – Trinidad and Tobago

TT$ – Trinidad and Tobagonian Dollar

TTCG – Trinidad and Tobago Coast Guard

TTDF – Trinidad and Tobago Defence Force

TTEC – Trinidad and Tobago Electricity Commission

TTEMAS – Trinidad and Tobago Emergency Mutual Aid Scheme

TTFS – Trinidad and Tobago Fire Service

TTMF – Trinidad and Tobago Mortgage Finance Company

TTPS – Trinidad and Tobago Police Service

TTR – Trinidad and Tobago Regiment

TTRCS – Trinidad and Tobago Red Cross Society

LIST OF ACRONYMS

UNECLAC – United Nations Economic Commission for Latin America and the Caribbean

UN – United Nations

UNETT – UN Emergency Technical Team

UNDP – United Nations Development Programme

UNDRR – United Nations Office for Disaster Risk Reduction (formerly UNISDR)

UNESCO – United Nations Educational, Scientific and Cultural Organization

UNSDGs – United Nations Sustainable Development Goals

UNFCC – United States Framework Convention on Climate Change

UNICEF – United Nations Children's Educational Fund

UNISDR – See UNDRR

UNOCHA – United Nations Office for the Coordination of Humanitarian Affairs (see also OCHA)

US – United States

USAID-OFDA – US Agency for International Development Office of Foreign Disaster Assistance

USD – United States Dollar

US NOAA – United States National Oceanic and Atmospheric Administration (or NOAA)

USSOUTHCOM – United States Southern Command (see also SOUTHCOM)

UWI-SRU – University of the West Indies Seismic Research Unit

VAT – Value Added Tax

VCA – Vulnerability and Capacity Assessment

WASA – Water and Sewerage Authority

WASH – Water, sanitation, and hygiene

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NDPBA

EXECUTIVE SUMMARY

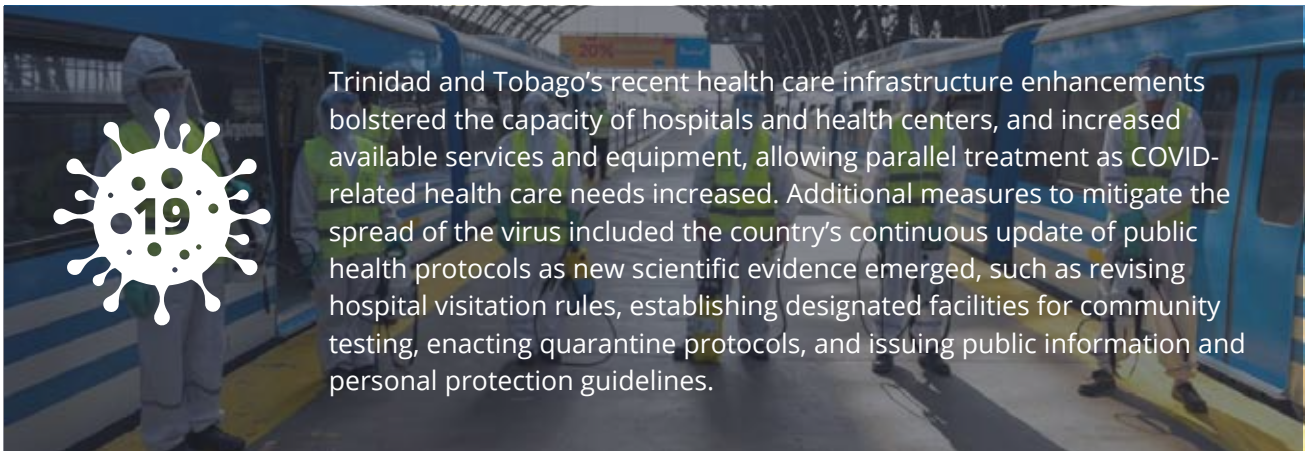
TRINIDAD AND TOBAGO

OVERVIEW

The Pacific Disaster Center (PDC) completed the Trinidad and Tobago National Disaster Preparedness Baseline Assessment (NDPBA) in partnership with the Republic of Trinidad and Tobago's Ministry of National Security (MNS) and its Office of Disaster Preparedness and Management (ODPM). Hazard-based risk, vulnerabilities, resilience, and disaster management capabilities were researched and analyzed to produce scientific data that can be used in the decision-making process during all phases of disaster management. The results are based on desk research and data made available by in-country partners during the period of the project from 2019-2020 and include recommendations that will increase disaster management readiness. The NDPBA provides stakeholders with analytical tools, scientific data, and evidence-based practices that allow the disaster management community in Trinidad and Tobago to reduce disaster risk and support response efforts. The methodology and associated recommendations are in alignment with the United Nations Sustainable Development Goals (UNSDGs) and the Sendai Framework for Disaster Risk Reduction (Sendai Framework) 2015-2030.

The NDPBA was funded by the United States Government through the US Southern Command and was conducted in coordination with the US Embassy in Port of Spain. Although MNS-ODPM was PDC's in-country partner during this project, the Center also developed relationships and data-sharing agreements with multiple government and non-governmental agencies in Trinidad and Tobago that supported the data gathering and vetting process.

The full report presents the data collected, assessment results, analysis of these results, and recommendations for closer alignment with the Sendai Framework. The following sections summarize findings for executive review.



Trinidad and Tobago's recent health care infrastructure enhancements bolstered the capacity of hospitals and health centers, and increased available services and equipment, allowing parallel treatment as COVID-related health care needs increased. Additional measures to mitigate the spread of the virus included the country's continuous update of public health protocols as new scientific evidence emerged, such as revising hospital visitation rules, establishing designated facilities for community testing, enacting quarantine protocols, and issuing public information and personal protection guidelines.

Although Trinidad and Tobago is a small country with challenges related to security and corruption, it has made meaningful progress towards understanding existing risks and creating an environment that allows the disaster management community to prepare the foundation for reducing disaster risk and increasing capabilities. Trinidad and Tobago's strong military culture and its Sub-Regional Focal Point (SRFP) role in the Caribbean Community's (CARICOM) Caribbean Disaster Emergency Management Agency (CDEMA) is one of the key strengths in creating and maintaining its disaster management (DM) capacity. Although progress has been made, there is much work to be done.

Trinidad and Tobago is a small developing island nation, situated between the Caribbean Sea and the North Atlantic Ocean, a mere seven miles from the northern coast of Venezuela. A twin island state, the larger island of Trinidad comprises 93% of the country's total area with three distinct mountain ranges, extensions of the Venezuelan coastal cordillera. The smaller island of Tobago has similar, but less pronounced geography. The country's landscape profile makes it prone to a range of geophysical and meteorological hazards. For this assessment, Trinidad and Tobago's exposure to flooding, earthquakes, landslides, tropical cyclones and coastal flooding were considered.

Trinidad's western coastline is home to three large cities, Port of Spain, San Fernando, and Chaguanas. Tobago's largest city is Scarborough. Trinidad and Tobago is one of the most diverse countries in the Caribbean, often referred to as a "melting pot" of cultures. As such, the populace holds differing risk perceptions when it comes to hazard awareness and disaster preparedness. Exposure to multiple hazards is compounded by socioeconomic vulnerabilities in Trinidad and Tobago. With abundant reserves of natural gas and petroleum, the country has one of the highest per capita incomes in Latin America. However, security risks stemming from organized crime, as well as urban poverty and income inequalities pose challenges to broader economic advancement and sustainable development. The COVID-19 pandemic struck Trinidad and Tobago at a time of strong economic recovery. Consequently, GDP is expected to decline in the near term, slowing economic development and poverty reduction. The recent refugee crisis has put additional strain on the economy, as well as social services, environmental resources, and critical infrastructure.

Despite the multi-hazard geography and geology, Trinidad and Tobago has been relatively quiet in recent years in terms of natural disasters with the exception of floods. Trinidad and Tobago is particularly prone to seasonal rainfall and flooding. From 1990 to 2020, rainfall and coastal flooding events affected around 150,000 people and caused $3.8 million USD in losses, with $3.7 million USD of those losses a result of the October 2018 floods. The country has been spared from major hurricane impacts in recent years, but has a history

of losses; in 2004, damages caused by Hurricane Ivan resulted in losses of $1 million USD. The country lies in a seismically active zone, with the Central Range Fault running east to west across the island of Trinidad. According to the University of West Indies (UWI) Seismic Research Centre the country is deemed overdue for a major earthquake. [1] Landslides and mudslides pose additional problems, especially during flood events, causing damage to property and infrastructure. The 2012 landslide and flooding that occurred in Diego Martin caused significant property loss. [1]

In the face of these challenges, the Government of Trinidad and Tobago has taken important steps to provide for the safety of its citizens. Among these are the 2005 legislation establishing the ODPM, which expanded the mandate of its predecessor, the National Emergency Management Agency (NEMA). The ODPM's role as the chief coordinating agency for disaster management is responsible for mobilizing DM actors, protecting public health and safety, restoring government services and providing emergency relief to disaster-affected populations. ODPM's function has been strengthened by the establishment of the Tobago Emergency Management Agency (TEMA) and Disaster Management Units (DMUs) in each of the 14 municipalities. Together these steps have bolstered subnational DM capacity and enhanced overall DM coordination.

While Trinidad and Tobago has a relatively strong economy through its natural gas and oil revenues, budget deficits make it difficult to assign a dedicated DM budget to cover disaster losses. The country is a regional financial center with a well-regulated and relatively stable system despite the challenges noted above. The sovereign wealth fund that equals one and a half times the national budget serves as a proxy budget for contingency funds. Formal arrangements with CARICOM-CDEMA allow for the country to enter borrowing agreements should a major disaster happen, however parliamentary approval has not yet been realized. The Caribbean Catastrophe Risk Insurance Facility (CCRIF) is another major regional instrument for risk transfer to which Trinidad and Tobago contributes regularly so as to use funds when loss events occur.

While the country has policies and plans to address the DM cycle, a national disaster recovery strategy is largely missing. Furthermore, strategic polices and plans are in dire need of updating since they were drafted more than ten years ago. Nonetheless, the recent revival of the Draft Disaster Management Bill with the help from regional and international partners like CDEMA and the International Federation of the Red Cross (IFRC) is promising, and will align the system to the Comprehensive Disaster Management (CDM) Strategy that CDEMA adopted as its principle.

SUMMARY
OF FINDINGS

The Ministry of National Security (MNS), through the Office of Disaster Preparedness and Management (ODPM), leads the nation's effort in preparing for, responding to and recovering from disasters. Committed to an all-hazards approach for disaster risk management, ODPM coordinates and mobilizes keystakeholderorganizationsandresourcesincluding government ministries and agencies, protective services, Non-Governmental Organizations (NGOs), and community- and faith-based organizations in all phases of disaster management to prevent and reduce hazard impactsat the national level.

In coordination with Ministry of Rural Development and Local Government (MRDLG), Trinidad's local Disaster Management Units (DMUs), and the Tobago Emergency Management Agency (TEMA), ODPM develops plans and procedures for vertical and horizonal support of comprehensive disaster management and disaster risk governance.

Research findings identify potential gaps in plan integration, disaster financing, addressing the needs of vulnerable populations, information management and sharing, coordination of stakeholders, and mitigation of long-term climate impacts. Fortunately, in-country efforts are already underway to move

NATURAL HAZARD EXPOSURE

153,000
people affected by natural disasters (1990 - 2018)

8
lives claimed by natural disasters (1990 - 2018)

Floods

Earthquake

Landslide

Wildfire

Tropical Cyclone Winds

Coastal Flooding

Exposure to natural hazards in Trinidad and Tobago is compounded by socioeconomic vulnerabilities. Security risks stemming from organized crime, as well as urban poverty and income inequalities pose challenges to broader economic advancement and sustainable development.

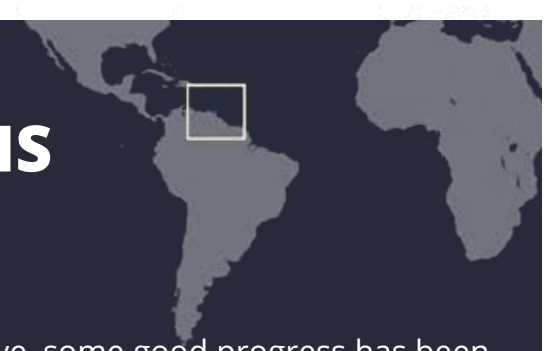
toward greater disaster risk reduction and resilience. The Government of Trinidad and Tobago has already made headway toward integrating NGO, private sector, and academic actors into Disaster Risk Management/Disaster Risk Reduction (DRM/DRR) initiatives, spearheading multiple programs that address community needs, such as the Emergency Management Association of Trinidad and Tobago (EMATT) and Communities Organized and Ready for Emergencies (CORE), as well as the expansion of early warning capabilities for

RECENT MAJOR DISASTERS

2020
Severe Flooding

2019
Tropical Cyclone

$ 3.7 million
Total economic losses due to severe flooding in October 2018.



RECOMMENDATIONS
TRINIDAD AND TOBAGO

As highlighted in the Summary of Findings above, some good progress has been achieved by Trinidad and Tobago. However, many additional actions can be taken by the government and its partners to further build capacity for disaster resilience and response. In light of our findings, PDC makes the following

- Establish a comprehensive legal framework to enable ODPM as the fully-funded lead national agency
- Develop formal budget arrangements specifically for disaster management
- Refine financial support mechanisms for DM/DRR including microfinancing and long-term disaster aid
- Formally develop, integrate, and regularly update plans and Standard Operating Procedures (SOPs)
- Integrate NGO/private sector actors into key DRM/DRR activities at the national and subnational levels
- Develop and implement expedited mechanisms to meet needs of disaster-impacted communities
- Formalize incident coordination and emergency operations

Note: An expanded version of these recommendations appears later in the report following the Risk and Vulnerability (RVA) and Disaster Management Analysis (DMA) results under the heading National Recommendations.

(RECOMMENDATIONS CONTINUED)

- Enhance the capacity of the national fire force
- Enhance mass care capacity and establish national emergency evacuation and sheltering procedures
- Establish a national training and exercise program with ODPM as lead agency
- Advance professionalization of the DRM field through research and education programs
- Institutionalize multi-hazard mapping and risk and vulnerability assessments
- Strengthen multi-hazard monitoring and early warning capabilities
- Promote data collection, management, and sharing
- Reduce disparities in infrastructure and increase resilience nationwide by implementing physical and social resilience projects
- Reassess progress made toward DRM/DRR goals by updating the NDPBA

AN

INTRODUCTION

TO PDC'S NATIONAL DISASTER PREPAREDNESS BASELINE ASSESSMENT (NDPBA)

The NDPBA uses a collaborative, stakeholder-driven approach, PDC worked to integrate national priorities and stakeholder feedback throughout every step of the process. The NDPBA for Trinidad and Tobago included a Risk and Vulnerability Assessment (RVA) which examined several components of risk including exposure to hazards, vulnerability, coping capacity, and existing disaster management capabilities. The findings of the RVA were further reviewed through the lens of PDC's unique Disaster Management Analysis (DMA). The DMA contextualizes the RVA and guides recommendations designed to increase resilience and reduce disaster risk. Based on findings, national recommendations were developed along with a five-year plan outlining practical actions that can be taken to reduce disaster risk and enhance disaster management capacity.

To receive access to the findings, recommendations and data (tabular and spatial) used to conduct the Trinidad and Tobago NDPBA analysis please visit the Pacific Disaster Center's DisasterAWARE platform and request access, visit emops.pdc.org.

TRINIDAD AND TOBAGO NDPBA

APPLYING ASSESSMENT RESULTS

The Pacific Disaster Center's (PDC) National Disaster Preparedness Baseline Assessment (NDPBA) is more than just an assessment, it is a sustainable system for accessing, understanding, updating, and applying critical risk information in decision making. The NDPBA provides the necessary tools, scientific data, and evidence-based practices to effectively reduce disaster risk—informing decisions at the national, subnational, and local level.

STRENGTHEN PARTNERSHIPS

- Use the NDPBA as a decision-support tool to create a transparent and efficient process for disaster risk reduction efforts within the context of Trinidad and Tobago.
- Provides necessary tools and data for disaster monitoring to promote risk-informed decision making and sustainable development.
- Allows team members to conceptualize risk as a function of data, measuring the social, cultural, and economic drivers of risk.

SUPPORT SENDAI COMMITMENTS

By participating in the NDPBA process, Trinidad and Tobago significantly enhances its capacity to meet Sendai Framework commitments under each of these Priority Areas:

- **Priority 1** - Understanding Disaster Risk
- **Priority 2** - Strengthening Disaster Risk Governance to Manage Disaster Risk
- **Priority 3** - Investing in Disaster Risk Reduction for Resilience
- **Priority 4** - Enhancing Disaster Preparedness for Effective Response and to "Build Back Better" in Recovery, Rehabilitation and Reconstruction

INCREASE RESILIENCE

- Align in areas where partner capacity development efforts overlap.
- Improve resilience at the subnational level and reduce potential impacts to the population.
- Rely on trusted and proven data-driven tools.

NDPBA

METHODOLOGY AND OBJECTIVES

OVERVIEW

RVA METHODOLOGY

MEASURING RISK

COMPONENTS OF RISK

Subcomponents

- Population Pressures
- Gender Inequality
- Economic Constraints
- Information Access
- Clean Water Access
- Health Status
- Environmental Stress

The NDPBA methodology is based on a composite index approach and investigates the underlying conditions that lead to increased risk. The assessment combines several components of risk which include multi-hazard exposure, coping capacity, and vulnerability. Individual components are comprised of subcomponents used to assess the status of thematic areas either as a sum or individually. Additional information on the assessment methodology can be found at: https://pdc.org/methodology.

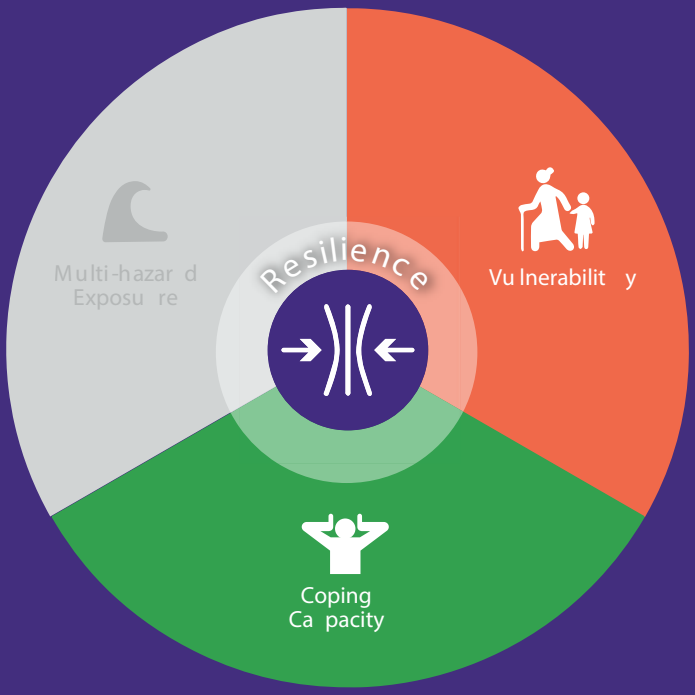
OBJECTIVE

Form a foundation for long-term data sharing and monitoring to support disaster risk reduction. Enhance decision making through improved access to temporal and spatial data.

RVA METHODOLOGY

MEASURING RESILIENCE

RESILIENCE



Hazard Independent

Components of resilience are independent of natural hazard exposure. This type of measure helps rank countries based on their likelihood of experiencing a disruption outside of a naturally occurring event. The measure of resilience includes vulnerability and coping capacity components, including their subcomponents.

OBJECTIVES

Use vulnerability and coping capacity indicators to determine initiatives and engagements that will decrease vulnerability and reduce disaster risk by increasing the resiliency of the population.

RVA METHODOLOGY
KEY CONCEPTS

EXAMPLES AND DEFINITIONS

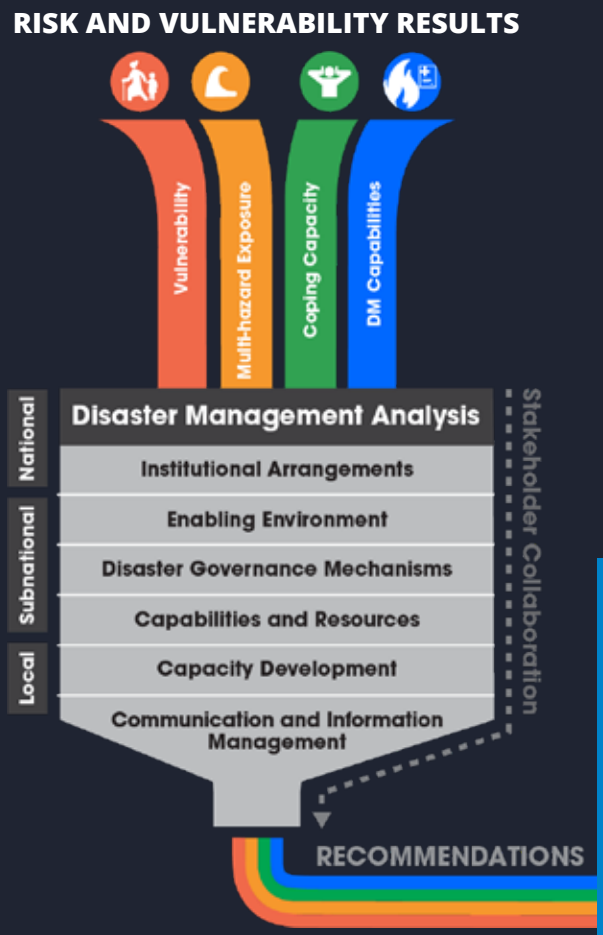
VULNERABILITY: Provides visibility into the underlying socioeconomic and societal factors that predispose areas to disasters. A vulnerability analysis measures the physical, environmental, social, and economic conditions and processes that increase susceptibility of communities and systems to the damaging effects of hazards. Multiple factors influencing disaster outcomes, including those linked to poverty and development, are considered in the analysis.

COPING CAPACITY: Provides visibility into the status of governance and capacity within each municipality. A coping capacity analysis measures the systems, means, and abilities of people and societies to absorb and respond to disruptions in normal function. It considers a range of factors that contribute to the ability of an impacted population to limit the likelihood or severity of the damaging effects of hazards and to manage disruptions that do arise.

RESILIENCE: Provides an overall measure of the ability of a municipality to withstand shocks and disruptions to normal function. For instance, municipalities with lower resilience may also exhibit a decrease in the ability of a population to mitigate the negative impacts of a disaster and return to normal function. This measure is the combination of the vulnerability and coping capacity components.

DMA METHODOLOGY

DISASTER MANAGEMENT ANALYSIS



ANALYSIS OBJECTIVE

Increase resilience and reduce disaster risk through disaster management capacity development initiatives.

The Disaster Management Analysis (DMA) identifies, codifies, and characterizes capacity implementation needs given risks identified in the RVA and a country's risk reduction goals. The analysis looks at the capabilities, resources, and systems that have been developed or implemented to reduce disaster risk, to address unmet needs that arise from a subsequent disaster event, and to facilitate long-term recovery of people, economies, and societies.

DISASTER MANAGEMENT THEMES

The DMA aims not only to limit hazard risk as assessed, but also address the anticipated response and recovery needs of hazard-exposed populations, economies, and societies. The manner in which unmet capacity is identified, qualified, and quantified supports a sharper focus on cost-effective investment planning. It also helps support long-term development in a manner that directly reflects the Sendai Framework and Sustainable Development Goals. The analysis considers needs in relation to multi-hazard risk, and is based on sector-defined capacity standards. Associated themes are listed below with examples of the data and information that help to inform the analysis.

Institutional Arrangements

Enabling Environment

Disaster Governance Mechanisms

Capabilities and Resources

Capacity Development

Communication and Information Management

COUNTRY OVERVIEW

TRINIDAD AND TOBAGO

GEOGRAPHY

Location: Trinidad and Tobago is located just seven miles from the northeast coast of Venezuela, with the Gulf of Paria to its west, the Atlantic to its east and the Caribbean Sea to its northwest. The island of Trinidad is roughly 60 km long and 80 km wide. Tobago lies 30 km to the northeast of Trinidad and is approximately 42 km long and 13 km wide. Together, the islands make up 5,128 square kilometers in land area. Trinidad, once part of continental South America has a variety of tropical vegetation and wildlife considerably more diverse than that of most Caribbean islands, Tobago is for the most part similar but less diversified.

Major regions

- Couva- Tabaquite- Talparo
- Diego Martin
- Mayaro-Rio Claro
- Penal-Debe
- Princes Town
- San Juan-Laventille
- Sangre Grande
- Siparia
- Tobago
- Tunapuna- Piarco

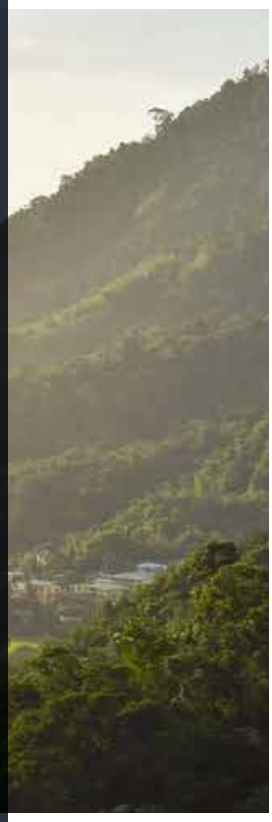
5,128 sq km
(1979.9 sq mi) Total Area

362 km
(224.9 mi) Coastline

15
Municipalities and Regional Corporations

Neighboring countries
Barbados, Dominica, Grenada, Martinique, St. Lucia, St. Vincent and the Grenadines, Venezuela

Municipalities:
Port of Spain
San Fernando
Chaguanas
Arima
Point Fortin



GEOLOGY AND CLIMATE

Geology and hydrology: Trinidad and Tobago lies within an active seismic zone on the southern border of the Caribbean plate, which carves right through the northern region of the island under the Caribbean Sea and frequently experiences earthquakes. Tsunamis occur less frequently but have the potential for severe impacts. Flooding is the most prevalent hazard in Trinidad and Tobago, the effects of which are worsened by planning and development issues.

150,000
People affected by flooding from rainfall and coastal flooding (1990-2020)

$3.8 million USD
Flood Losses (1990-2020)

Climate: Trinidad and Tobago has a maritime tropical climate characterized by two seasons annually. The dry season stretches from January to May, and the rainy season extends from June to December.

Key climate change risks for the country include increases in:

Floods | Drought | Food Insecurity | Water and Vector borne diseases | Landslides | Extreme temperature | Severe storms

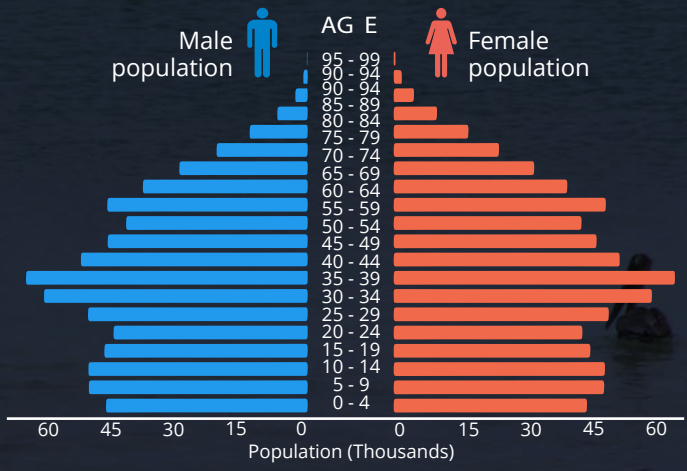
DEMOGRAPHICS

1.39 million
Total population (2019)

133rd
Global socioeconomic vulnerability ranking

153rd
Most populous country in the world

0.51%
Avg annual population growth (2000-2019)[6]



Age 73.5
Average life expectancy (2019)[4]

11.5
Infant Deaths per 1,000 live births (2019)[3]

98.7%
Adult Literacy [8]

42
Doctors per 10,000 people (2018)[2], [3]

41
Nurses per 10,000 people (2018)[3], [5]

30
Hospital beds per 10,000 people (2017)[3], [7]

ECONOMY

As of 2019, Trinidad and Tobago's GDP was $24.3 billion USD. Trinidad and Tobago is one of the top producers of oil and gas in the Western Hemisphere which make up 80% of exports but less than 5% of employment. The US is the largest trading partner accounting for 48% of its exports and 28% imports. The country's top imports are refined petroleum, excavation machinery, shipping containers, iron, and cars.

$24.3 billion USD
Gross domestic product (GDP) 2019

-1.4%
Average annual growth in GDP (2015-2019) [10]

20%
People living below national poverty line (2014)

Key exports:

Petroleum and Natural Gas
Steel Products
Cosmetics
Household Cleaners
Chemicals (e.g. Ammonia, Urea, Methanol)
Beverages
Cocoa
Preserved Fruits
Fish
Plastic Packaging
Cereal and Cereal Products

Major industries (% of GDP):

1% Agriculture
42% Industry
57% Services

(COUNTRY OVERVIEW CONTINUED)

TRINIDAD AND TOBAGO

KEY INFRASTRUCTURE

While development efforts in recent years have focused on expansion of and improvements to existing infrastructure, additional enhancements are needed to better serve the transportation, water and sanitation and information and communications technology needs of the country's population. Implementation of risk reduction measures in all infrastructure improvements will help alleviate hazard impacts, particularly those related to flooding and landslides.

Transportation

13,399 km
Roads

3
Airports

2
Medium Airports

1
Small Airports

10
Main Ports

1
Medium Ports

4
Small Ports

5
Very Small Ports

98%
Access to electric lighting

96%
Households with access to improved water

11%
Households with inadequate toilet facilities

Emergency services

79
Police Stations

24
Fire Stations

489
Shelters

221
Firefighters

DISASTER MANAGEMENT

- The Disaster Measures Act, Chapter 16:50 of 1978 forms the basis for emergency management capacity in Trinidad and Tobago.
- The National Disaster Response Framework (NDRF) provides strategic guidance into disaster preparedness and response with the hazard specific annexes.
- The revival of the Disaster Risk Management Bill under the leadership of ODPM with support from domestic and international stakeholders such as TEMA, IFRCS, and CDEMA is a major step towards capacity building.
- Establishment of a building code council, and creation and legislation of new and stronger building codes puts the country on the path to resilience against hurricanes, floods, and particularly earthquakes.
- The Public Sector Investment Programme with capacity enhancement measures at the municipal level is a major step towards strengthening sub-national governance in DM.
- Early adoption of Sendai Framework for DRR.

Major capacity improvements / milestones (past 10 yrs)

Major disaster impacts (2010-2020)

Tropical Cyclone Arthur (July 1990)
Affected: 1,000
Severe Flooding in Tobago

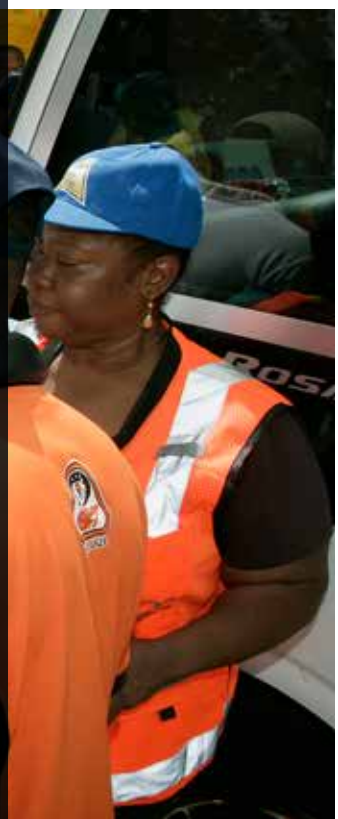
Earthquake M6.1 (22 April 1997) Near Trinidad
Affected: 17
Losses: $25 Million USD

Landslide, Delaford City, Tobago (12 November 2004)
Deaths: 2
Affected: 1200

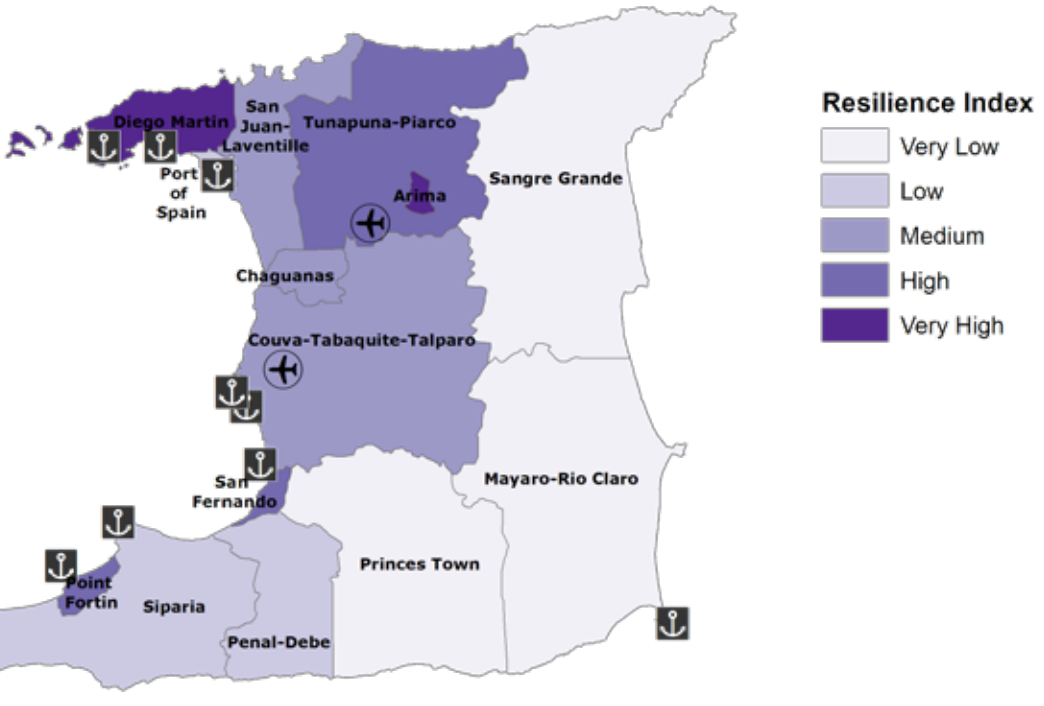
Flash Flood (October 1993), Port of Spain, St. Ann's
Deaths:5
Affected: 10
Losses: $70,000 USD

Tropical Cyclone Ivan (September 2004), Couva-Tabaquite-Talparo, Tunapuna-Piarco regions
Deaths: 1, Affected: 560
Losses: $1 million USD

Severe Flooding (October 2018), Sangre Grande, Tunapuna-Piarco, Couva-Tabaquite-Talparo, Mayaro-Rio Claro regions
Affected: 150,000
Losses: $3.7 million USD



TRINIDAD AND TOBAGO RESILIENCE AND KEY INFRASTRUCTURE



THE RVA

RISK AND VULNERABILITY

ASSESSMENT RESULTS

THE RVA

RISK AND VULNERABILITY ASSESSMENT RESULTS

Provided in this section are the results of the Risk and Vulnerability Assessment (RVA) conducted by the Pacific Disaster Center as part of the Trinidad and Tobago National Disaster Preparedness Baseline Assessment. For details on the methodology and data sets used see Appendix A.

TRINIDAD AND TOBAGO BACKGROUND

Trinidad and Tobago's diverse geography ranges from low-lying coastal areas and wetlands to plains, forested hills, and mountains. Together, the islands are divided into 15 administrative boundaries, a combination of municipalities and regional corporations (generally referred to as municipalities), forming the basis for RVA data comparison.

TRINIDAD AND TOBAGO MUNICIPALITIES

COMPONENTS OF RISK

Vulnerability

Coping Capacity

Resilience

THE RVA

MULTI-HAZARD EXPOSURE

RESULTS BREAKDOWN

THE RVA

MULTI-HAZARD EXPOSURE

Trinidad and Tobago's geographic location in the tropics and within an area of seismicity make it prone to a variety of meteorological and geophysical hazards including flooding, earthquakes, landslides, wildfires, tropical cyclones and coastal flooding.

Two main seasons dominate the local climate – the rainy season spans the months of June to December, and the dry season stretches from January to May. Weather in the islands is strongly influenced by northeast trade winds, which bring significant rainfall to the highland areas of northeast Trinidad and the upland ridge of Tobago. Situated within the southern fringe of the Atlantic hurricane belt, Trinidad and Tobago also experiences damaging tropical cyclones. Over the past century, 10 severe tropical cyclones have affected the islands either directly or indirectly [11].

Earthquake activity in the country results from its location within a seismically active zone near the convergence of the Caribbean and South American tectonic plates. According to mapping performed by the University of the West Indies Seismic Research Centre, both Trinidad and Tobago experience earthquakes of MMI VII and above.

The EMDAT disaster database recorded 11 disaster events between 1990 and 2018 for Trinidad and Tobago that affected over 153,000 people and caused $29.8 million USD in damages.

More recently, in September 2019 Tropical Storm Karen brought heavy rainfall, strong winds and rough seas to the dual-island nation.[12] In August of 2020, a heavy rainfall event accompanied by strong winds caused flash flooding and landslides over parts of Trinidad, destroying several homes and blocking roadways. Over 120mm of rain fell over Caura within a 9-hour period.

According to the 2014 Ministry of National Security (MNS)/Office of Disaster Preparedness and Management (ODPM) archives, flooding, landslides, fires and high wind events occur with the greatest frequency. [13] With a population of nearly 1.4 million people [14] and exposure to multiple hazards, Trinidad and Tobago's disaster risk reduction efforts are of paramount importance to protect the lives and welfare of its citizens.

Global Multi-Hazard Exposure Rank

26 OF 207 COUNTRIES

Trinidad and Tobago's Rank among Latin American and Caribbean nations

11 OF 33 COUNTRIES

TRINIDAD AND TOBAGO ESTIMATED POPULATION AND CAPITAL EXPOSURE

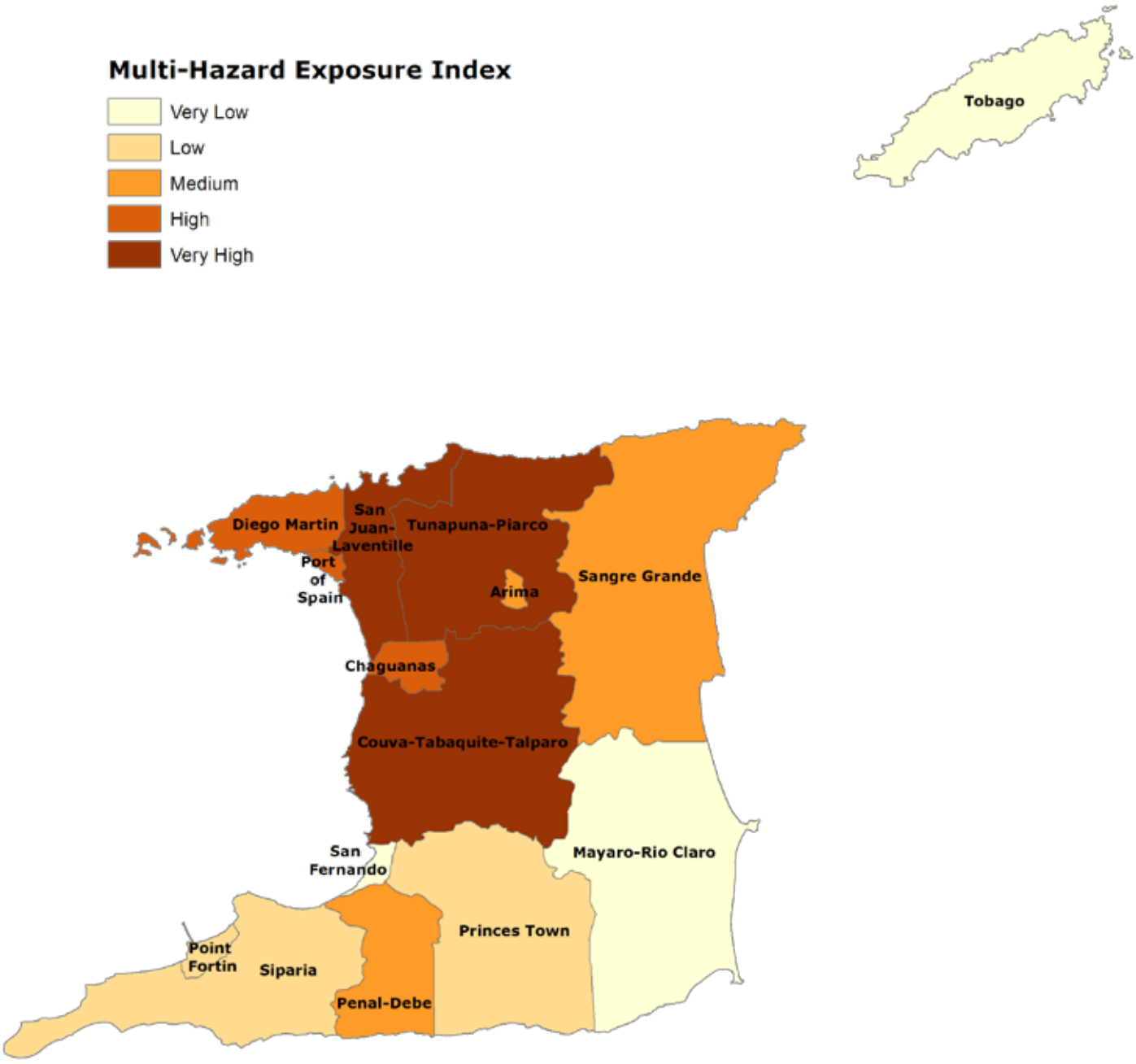
Multi-hazard exposure at the municipal level in Trinidad and Tobago was assessed by combining components of flood, earthquake, landslide, wildfire, tropical cyclone winds and coastal flooding.

Flood	Earthquake	Landslide	Wildfire	Tropical Cyclones	Coastal Flooding
89%	**100%**	**49%**	**29%**	**100%**	**12%**
1.2 Million	**1.4 Million**	**0.7 Million**	**0.4 Million**	**1.4 Million**	**0.2 Million**

MULTI-HAZARD EXPOSURE BY MUNICIPALITY

	RANK	MUNICIPALITY	INDEX SCORE
VERY HIGH	1	Tunapuna-Piarco	1
	2	San Juan-Laventille	0.873
HIGH	3	Couva-Tabaquite-Talparo	0.702
	4	Diego Martin	0.679
	5	Chaguanas	0.571
	6	Port of Spain	0.481
MEDIUM	7	Arima	0.441
	8	Sangre Grande	0.436
	9	Penal-Debe	0.42
LOW	10	Princes Town	0.416
	11	Point Fortin	0.39
	12	Siparia	0.366
VERY LOW	13	San Fernando	0.271
	14	Mayaro-Rio Claro	0.261
	15	Tobago	0.073

MULTI-HAZARD EXPOSURE BY MUNICIPALITY



THE RVA

VULNERABILITY

RESULTS BREAKDOWN

THE RVA

VULNERABILITY

Vulnerability measures the physical, environmental, social, and economic conditions and processes that increase susceptibility of communities and systems to the damaging effects of hazards. Vulnerability data is designed to capture the multi-dimensional nature of poverty, the inequality in access to resources due to gender, and the ability of a given area to adequately support the population. In coordination with stakeholders, the following indicators were selected to measure vulnerability subcomponents in Trinidad and Tobago. Breaking down each vulnerability subcomponent to the indicator level allows users to identify the key drivers of vulnerability to support risk reduction efforts and policy decisions.

Global Vulnerability Rank

133 OF 160 COUNTRIES

Trinidad and Tobago's Rank among Latin American and Caribbean nations

24 OF 28 COUNTRIES

VULNERABILITY SUBCOMPONENTS AND INDICATORS

Population Pressures
Net Recent Migration Rate
Average Annual Population Change

Gender Inequality
Female to Male Labor Ratio
Female to Male Secondary Education Attainment

Information Access Vulnerability
Percent of Households with No Internet Access
Percent of Households with No Television
Percent of Households with No Radio
Percent of Adults with Less than Secondary Education

Economic Constraints
Households with no Vehicle for Private Use
Age Dependency Ratio
Percent of Population below Poverty Line
Percent of Population with Unmet Housing Need

Vulnerable Health Status
Percent persons with Chronic Illness
Percent persons with long-standing Disability
Population in Collective Living Quarters
Infant Mortality Rate
Chikungunya Cases per 10,000 persons
Dengue Cases per 10,000 persons
Zika Cases per 10,000 persons
Leptospirosis Cases per 10,000 persons

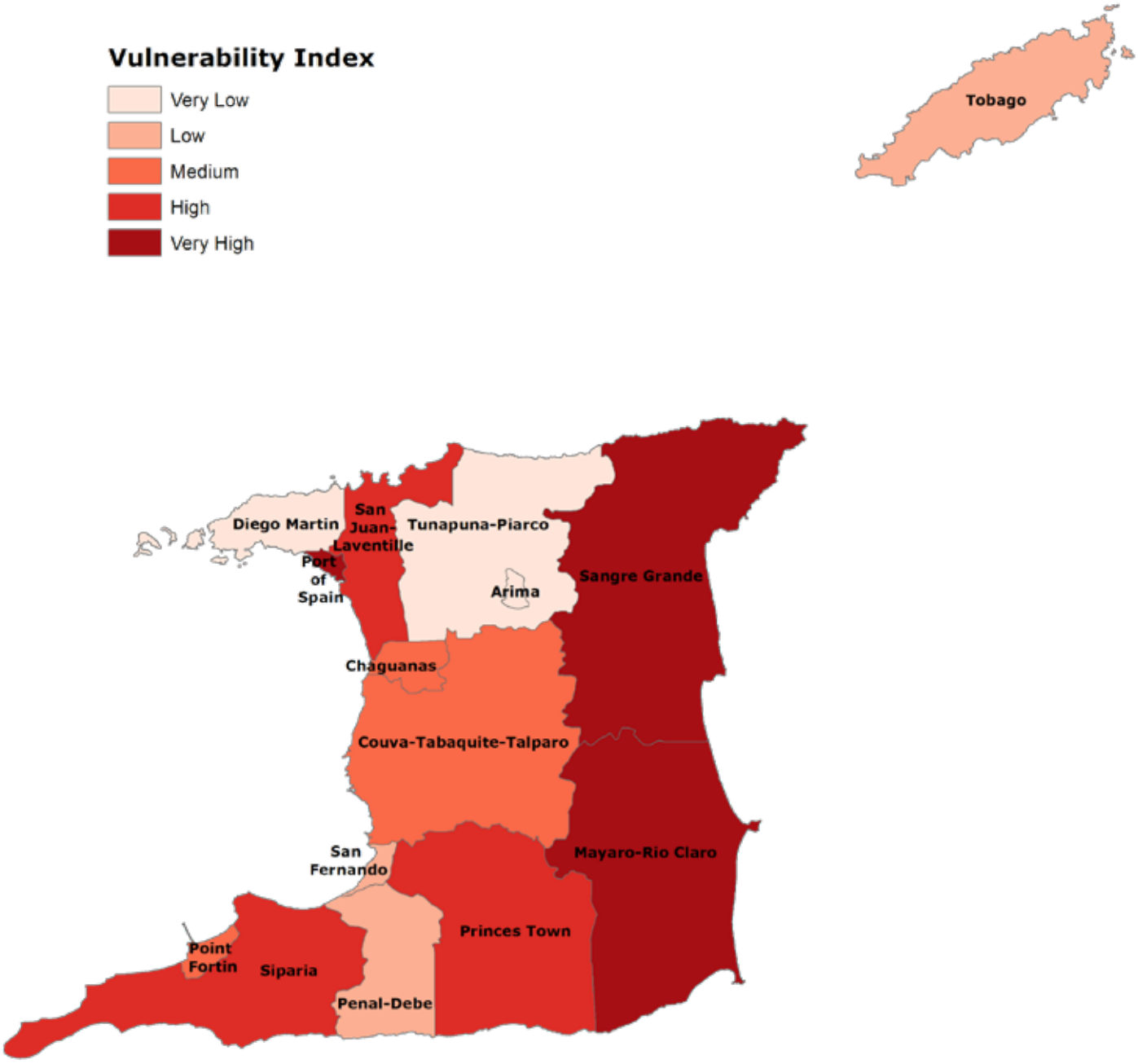
Clean Water Access Vulnerability
Percentage of Households with Improved Source of Water Supply
Percentage of Households with Inadequate Toilet Facilities

Environmental Stress
Percent of Households Affected by Deforestation
Percent of Households Affected by Drainage Issues
Percent of Households Affected by Flooding
Percent of Households Affected by Sewerage Issues
Percent of Households Affected by Soil Erosion
Percent of Households Affected by Solid Waste
Percent of Households Affected by Wastewater
Percent of Households Affected by Water Contamination

VULNERABILITY BY MUNICIPALITY

	RANK	MUNICIPALITY	INDEX SCORE
VERY HIGH	1	Sangre Grande	0.623
	2	Mayaro-Rio Claro	0.621
HIGH	3	Port of Spain	0.586
	4	Princes Town	0.521
	5	Siparia	0.498
	6	San Juan-Laventille	0.442
MEDIUM	7	Point Fortin	0.43
	8	Couva-Tabaquite-Talparo	0.426
	9	Chaguanas	0.425
LOW	10	San Fernando	0.4
	11	Penal-Debe	0.398
	12	Tobago	0.375
VERY LOW	13	Diego Martin	0.373
	14	Tunapuna-Piarco	0.365
	15	Arima	0.304

VULNERABILITY BY MUNICIPALITY



THE RVA

COPING CAPACITY

RESULTS BREAKDOWN

THE RVA
COPING CAPACITY

Coping Capacity describes the ability of people, organizations, and systems, using available skills and resources, to face and manage adverse conditions, emergencies, or disasters. In coordination with stakeholders, the following indicators were selected to measure coping capacity subcomponents in Trinidad and Tobago. Breaking down each coping capacity subcomponent to the indicator level allows users to identify the key drivers of coping capacity to support risk reduction efforts and policy decisions.

Global Coping Capacity Rank

51 OF 176 COUNTRIES

Trinidad and Tobago's Rank among Latin American and Caribbean nations

7 OF 30 COUNTRIES

COPING CAPACITY SUBCOMPONENTS AND INDICATORS

Economic Capacity
Labor Force Participation Rate
Household Income per Capita
Financial Institutions per 10,000 persons

Governance
Voter Participation
Percentage of Households with Unmet Need for Refuse Collection
Crime Rate per 10,000 persons

Environmental Capacity
Percent Protected Area per Municipality

Healthcare Capacity
Percentage of Persons with Private Health Insurance
Health Care Facilities per 10,000 persons
Average Distance to Hospital

Transportation Capacity
Road Density
Average Distance to Port Facility

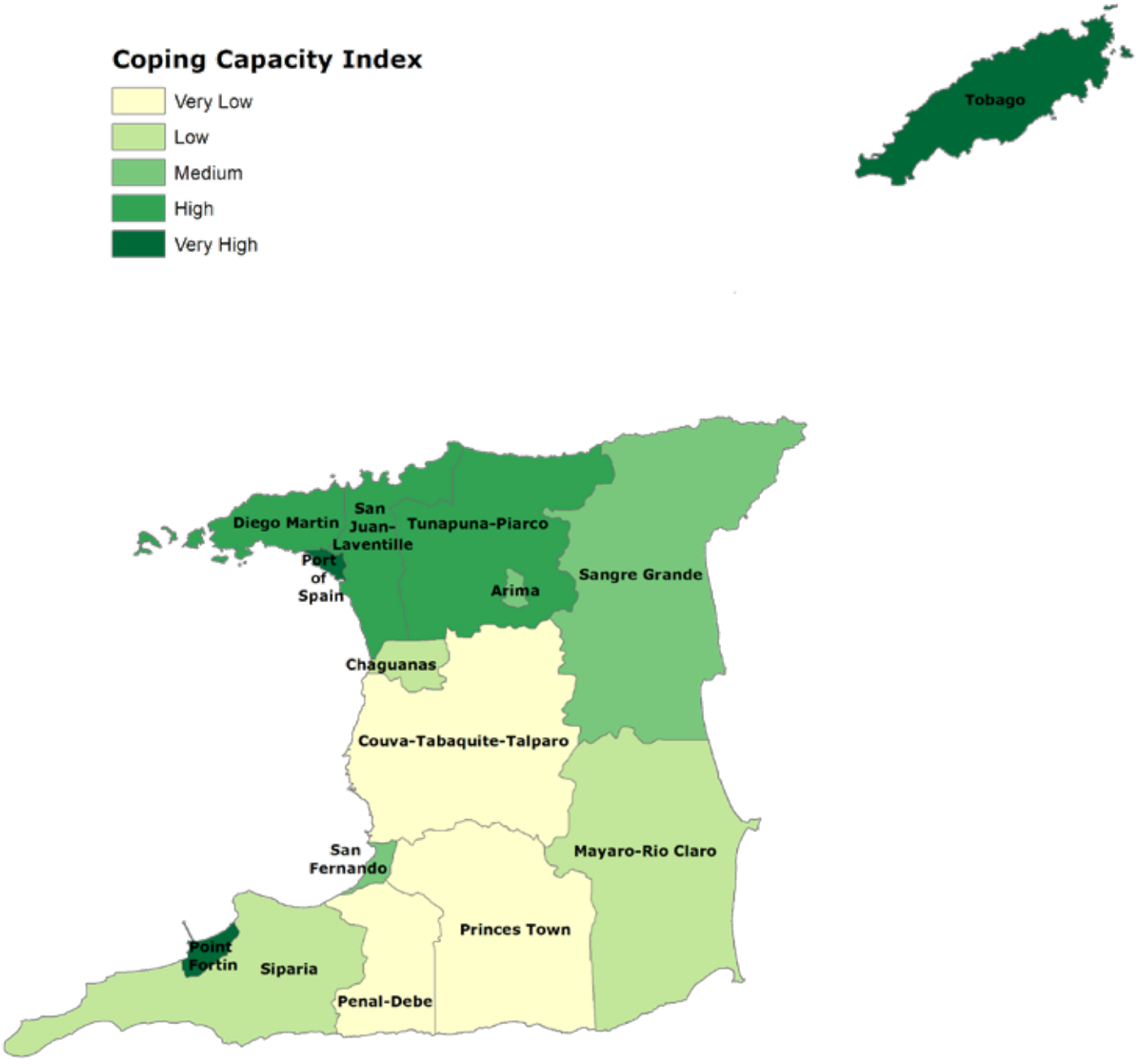
Communications Capacity
Mobile Phone Usage
Mobile and Wireless Infrastructure per 10,000 persons

Emergency Service Capacity
Distance to Nearest Fire Station
Distance to Nearest Police Station
Emergency Shelters per 10,000 persons

COPING CAPACITY BY MUNICIPALITY

	RANK	MUNICIPALITY	INDEX SCORE
VERY HIGH	1	Port of Spain	0.568
	2	Point Fortin	0.555
HIGH	3	Tobago	0.553
	4	Diego Martin	0.534
	5	San Juan-Laventille	0.521
	6	Tunapuna-Piarco	0.497
MEDIUM	7	Sangre Grande	0.495
	8	San Fernando	0.487
	9	Arima	0.467
LOW	10	Siparia	0.461
	11	Chaguanas	0.449
	12	Mayaro-Rio Claro	0.448
VERY LOW	13	Couva-Tabaquite-Talparo	0.444
	14	Princes Town	0.431
	15	Penal-Debe	0.411

COPING CAPACITY BY MUNICIPALITY



THE RVA

RESILIENCE

RESULTS BREAKDOWN

THE RVA
RESILIENCE

Resilience represents the combination of susceptibility to impact with the relative ability to absorb, respond to, and recover from short-term disaster impacts. Resilience provides an indication of current socioeconomic and disaster management conditions on the ground, independent of hazard exposure.

Global Resilience Rank

42 OF 165 COUNTRIES

Trinidad and Tobago's Rank among Latin American and Caribbean nations

3 OF 27 COUNTRIES

APPLYING RESILIENCE DATA

Resilience data can be used to:

- Prioritize response and recovery efforts during hazard events.
- Identify the social, cultural, and economic factors that influence disaster risk and vulnerability.
- Provide the necessary justification to support policy decisions that will protect lives
- Establish a municipal-level foundation for monitoring risk and vulnerability over time.
- Enhance decision making for disaster risk reduction initatives.

RESILIENCE COMPONENTS

Resilience in Trinidad and Tobago was calculated by averaging Vulnerability and Coping Capacity. Results are displayed across each municipality below, while the four main drivers of resilience with detailed recommendations are provided in the individual municipality profiles.

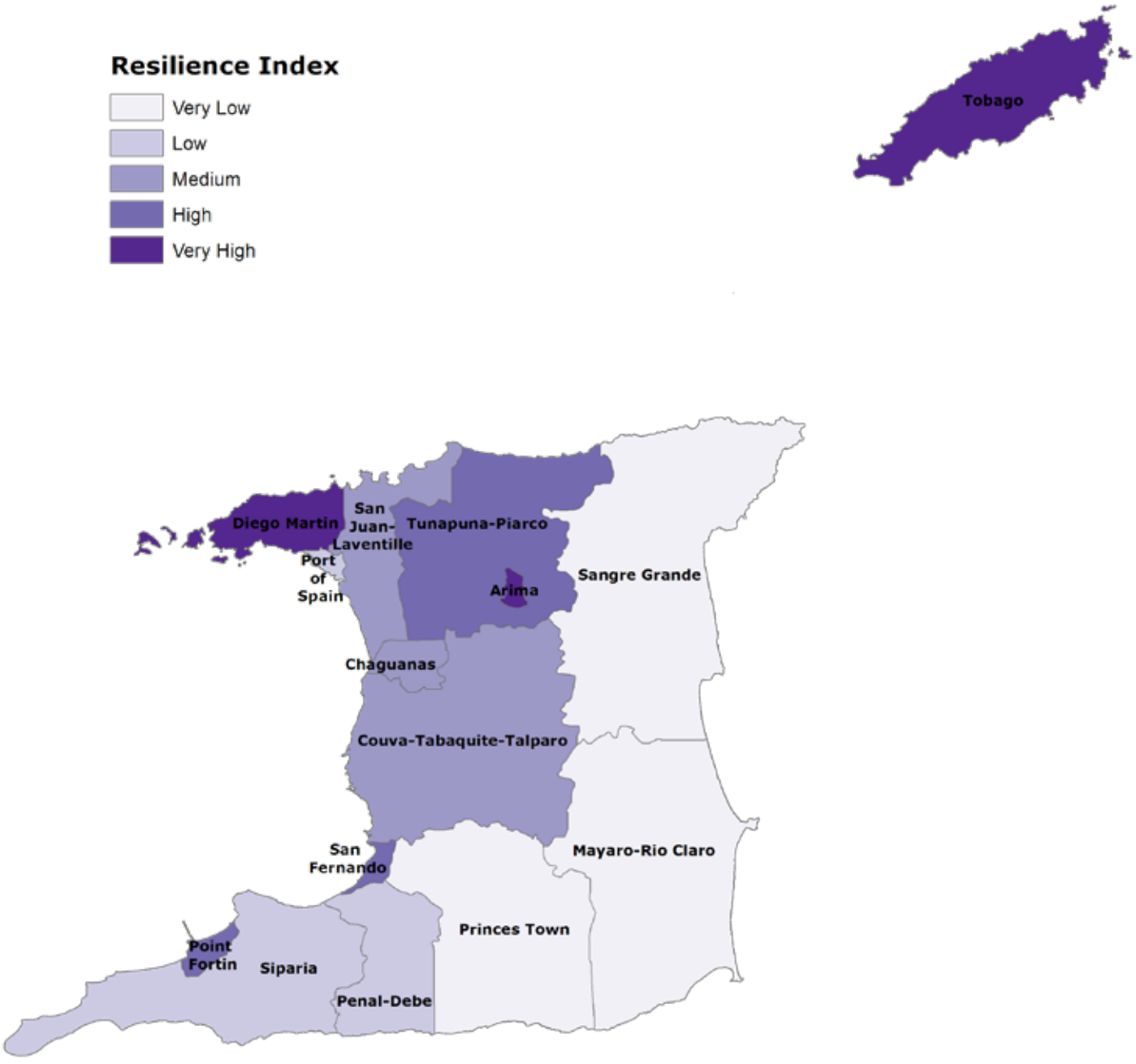
Vulnerability

Coping Capacity

RESILIENCE BY MUNICIPALITY

	RANK	MUNICIPALITY	INDEX SCORE
VERY HIGH	1	Tobago	0.589
	2	Arima	0.581
HIGH	3	Diego Martin	0.58
	4	Tunapuna-Piarco	0.566
	5	Point Fortin	0.562
	6	San Fernando	0.544
MEDIUM	7	San Juan-Laventille	0.539
	8	Chaguanas	0.512
	9	Couva-Tabaquite-Talparo	0.509
LOW	10	Penal-Debe	0.506
	11	Port of Spain	0.491
	12	Siparia	0.481
VERY LOW	13	Princes Town	0.455
	14	Sangre Grande	0.436
	15	Mayaro-Rio Claro	0.414

RESILIENCE BY MUNICIPALITY



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HAZARD-SPECIFIC RISK

RESULTS BREAKDOWN

THE RVA

HAZARD SPECIFIC RISK

Hazard-Specific Risk examines individual hazard exposure in combination with resilience at the municipal level to provide a clear understanding of risk drivers for each hazard type. Hazard-Specific Risk provides a tool for disaster managers to anticipate, plan for, and mitigate outcomes of specific hazard events across Trinidad and Tobago.

APPLYING HAZARD SPECIFIC RISK DATA

Hazard-specific risk data can be used to:

- Examine socioeconomic and cultural factors that make certain populations more susceptible to negative outcomes from a specific hazard.
- Anticipate potential impacts of a specific hazard on municipal-level population.
- Enhance national and subnational multi-hazard planning.
- Prioritize national and municipal-level hazard-specific mitigation actions.
- Provide necessary justification to enhance hazard monitoring and implement early warning systems.

HAZARD RISK COMPARED

Flood

Earthquake

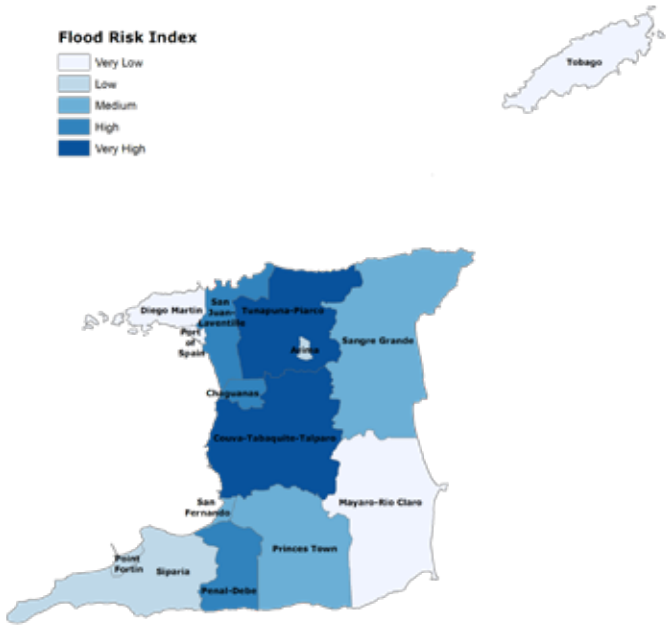
Landslide

Tropical Cyclone Wind

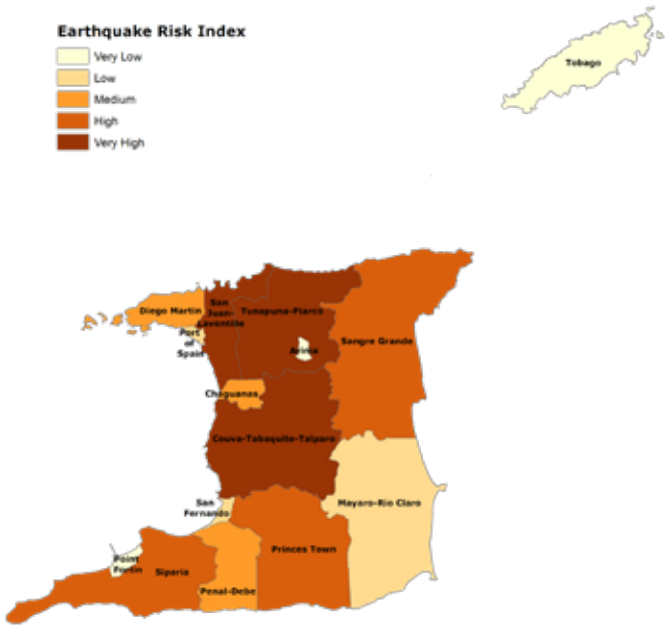
Wildfire

Coastal Flooding

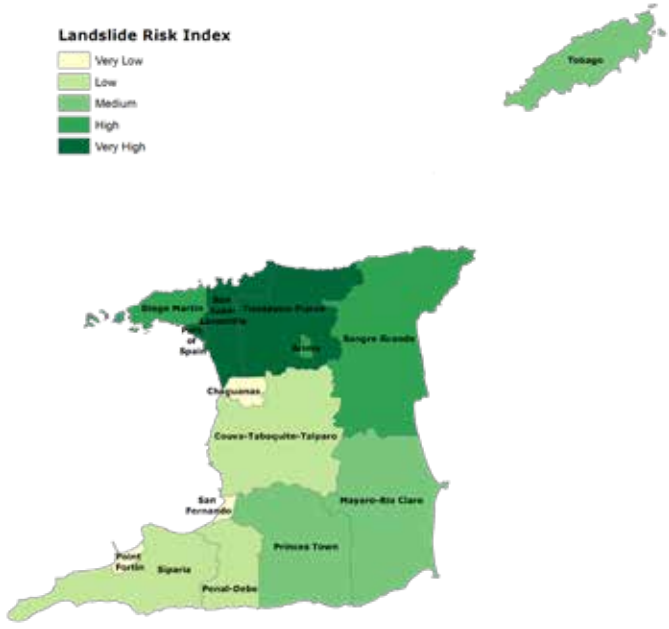
FLOOD RISK



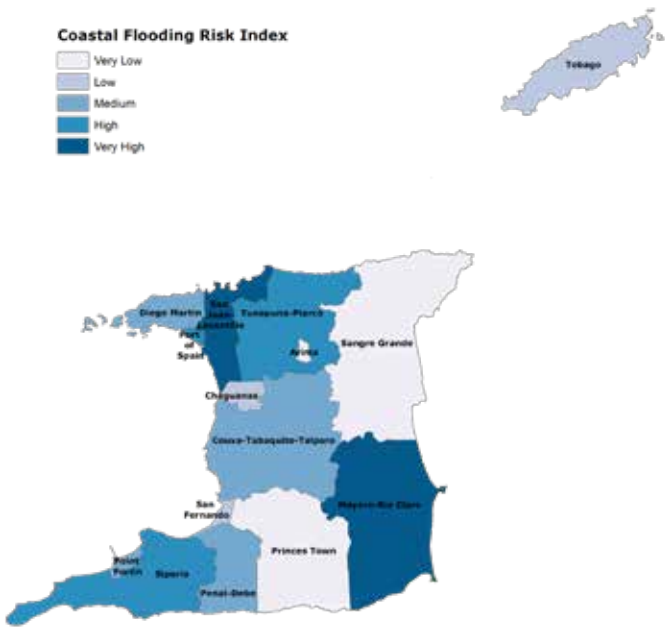
EARTHQUAKE RISK



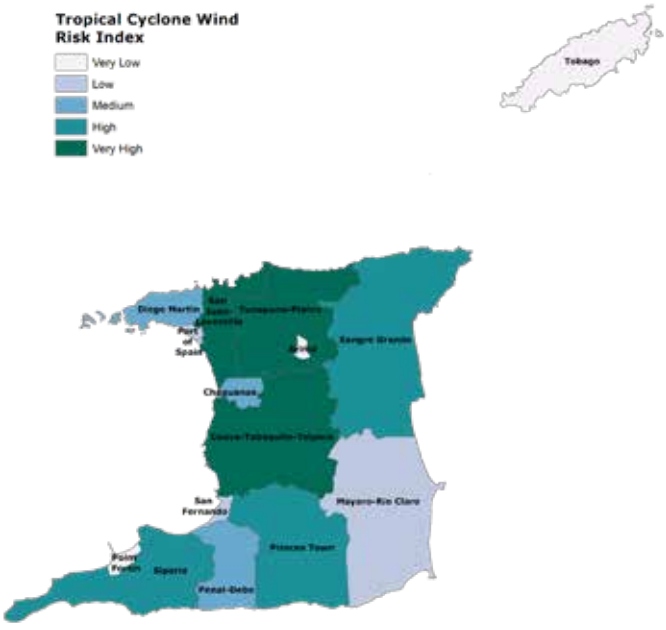
LANDSLIDE RISK



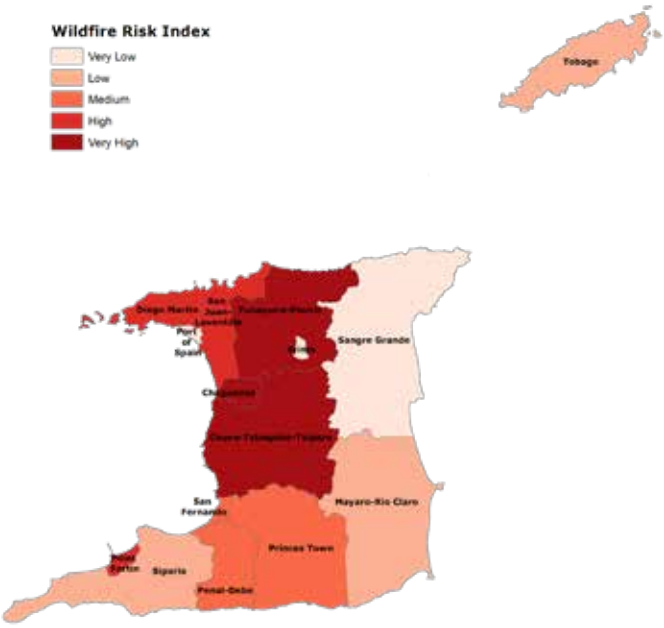
COASTAL FLOOD RISK



TROPICAL CYCLONE RISK



WILDFIRE RISK



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MULTI-HAZARD RISK

RESULTS BREAKDOWN

THE RVA
MULTI-HAZARD RISK

Multi-hazard risk combines hazard exposure, susceptibility to impact, and the relative ability to absorb negative disaster impacts to provide a collective measure of how each municipality may be affected by hazard and disasters as a whole over time. Analyzing risk information throughout all phases of disaster management – mitigation, preparedness, response, recovery – improves operations and promotes efficient resource allocation.

Global Multi-hazard Risk Rank

79 OF 155 COUNTRIES

Trinidad and Tobago's Rank among Latin American and Caribbean nations

17 OF 27 COUNTRIES

MULTI-HAZARD RISK COMPONENTS

Multi-hazard risk in Trinidad and Tobago was calculated by averaging multi-hazard exposure, vulnerability and coping capacity. Results are displayed across each municipality below, while additional detail on municipal risk is provided in the individual municipality profiles.

Multi-hazard Exposure

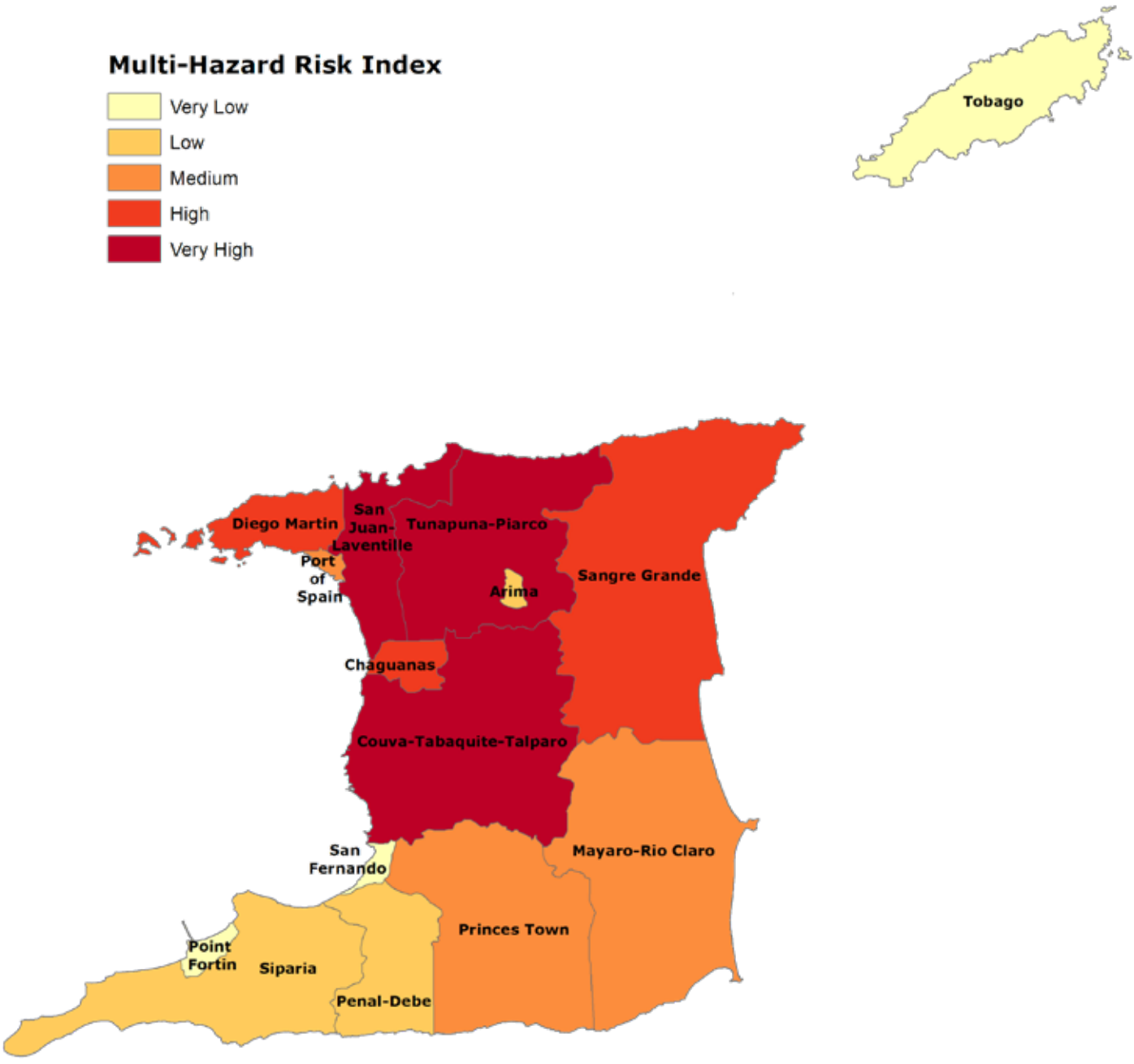
Vulnerability

Coping Capacity

MULTI-HAZARD RISK BY MUNICIPALITY

	RANK	MUNICIPALITY	INDEX SCORE
VERY HIGH	1	Tunapuna-Piarco	0.623
	2	San Juan-Laventille	0.598
	3	Couva-Tabaquite-Talparo	0.561
HIGH	4	Sangre Grande	0.522
	5	Chaguanas	0.516
	6	Diego Martin	0.506
MEDIUM	7	Princes Town	0.502
	8	Port of Spain	0.500
	9	Mayaro-Rio Claro	0.478
LOW	10	Penal-Debe	0.469
	11	Siparia	0.468
	12	Arima	0.426
VERY	13	Point Fortin	0.422
	14	San Fernando	0.394
	15	Tobago	0.299

MULTI-HAZARD RISK BY MUNICIPALITY



THE DMA

DISASTER MANAGEMENT ANALYSIS

FINDINGS AND RECOMMENDATIONS

THE DMA
DISASTER MANAGEMENT ANALYSIS
FINDINGS AND RECOMMENDATIONS

Provided in this section are the results of the Disaster Management Analysis (DMA) that was conducted as part of the Trinidad and Tobago National Disaster Preparedness Baseline Assessment. The outcome of the DMA enables more effective prioritization of risk reduction and resilience-building initiatives. Considering diverse community needs, operational successes and barriers, the DMA results enable decision makers and communities to prioritize actions for disaster risk reduction and disaster governance at all levels. The following section summarizes key findings in six broad areas of analysis: Institutional Arrangements; Enabling Environment; Disaster Governance Mechanisms; Capabilities and Resources; Capacities; and Communications and Information Management.

DISASTER MANAGEMENT ANALYSIS THEMES AND SUB-THEMES

Institutional Arrangements
Organizational Structures
Leadership Arrangements
Mechanisms for Stakeholder Engagement

Capabilities and Resources
Dedicated Facilities and Equipment
Human Resources
Inventory of Commodities and Supplies
Targeted Functional Capabilities

Enabling Environment
Legal Instruments
Financial Resources
Strategies
Public Confidence
Political Support
Attitudes and Experience

Capcapacity Development
Capacity Development Plans and Strategies
Training and Education Programs and Facilities
Certification Programs
After-Action Reporting
Monitoring and Evaluation Processes and Systems

Disaster Governance Mechanisms
Plans
Standard Operating Procedures
Emergency Operations Centers
Command, Control, and Coordination Systems

Communication and Information Management
Hazard and Risk Analysis Systems
Disaster Assessment
Media and Public Affairs
Information Collection, Management, and Distribution

INSTITUTIONAL ARRANGEMENTS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

The organizational and institutional structures through which disaster management capacity forms is an indication of a country's institutional arrangements. By examining the organization and composition of diverse agencies and individuals that constitute a nation's disaster management capacity—detailing the relationships and collaboration between them—tangible opportunities for increased effectiveness are often revealed. The DMA analyzes sub-themes that characterize institutional arrangements.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

Trinidad and Tobago's current institutional arrangements for DM have clear achievements with significant limitations.

Several discrete entities with DM functions are distributed throughout government agencies: Trinidad's DM is managed at the local level by the Disaster Management Units (DMUs) through the Ministry of Rural Development and Local Government (MRDLG) [15], and Tobago Emergency Management Agency (TEMA) independently manages all disaster events on island. ODPM, under the auspices of the MNS is the national coordinating agency that manages all phases of the DM cycle. Because there is no single entity in charge of all DM and DRM processes, the functions of leadership, coordination, DM, and DRM are not well delineated. Key institutional responsibilities necessary for ensuring an adequate level of risk identification have not been defined. [16, p. 37] Moreover, integration of DM policies and practices is not complete [15], [17]–[21], and there is reported confusion about roles and responsibilities. These challenges are further exacerbated by outdated policy instruments.

Whilst nongovernmental DM stakeholders regularly support governmental DM response efforts, no official national recognition of such roles exists in organizational arrangements, nor have their contributions in disaster response been well documented.

INSTITUTIONAL ARRANGEMENTS
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Actions needed to achieve advanced capacity:

Address staffing needs in critical DM functional areas

Create a formal NGO Association with program/mission areas focused on DM

Strengthen the national platform for Sendai Framework implementation and integrate DRR, Climate Change Adaptation (CCA), and Sustainable Development (SD)

Institute nationwide training and exercise programs that link to competencies for leadership positions and relevant staff

Strengthen policies by incorporating NGOs and private sector in the DRM decision making process

Include academia in DM through linking research and training needs to academic programs

INSTITUTIONAL ARRANGEMENTS
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

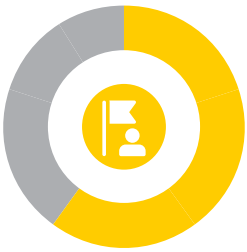
Organizational Structures

- Organization of disaster management functions
- Organization of governmental disaster management offices
- Engagement with bilateral, international, and other humanitarian actors
- Regionalized disaster management capacity
- National platform/office to manage DRR and Sendai Framework implementation
- National platform/office to manage CCA
- National platform/office to manage SD 2030 agenda
- Integration of military into civil DM structure
- Integration of DRR, CCA and SD
- Political Support
- Attitudes and Experience

Several government entities are responsible for DM. In the event that TEMA and/or the DMUs become overwhelmed in a disaster ODPM serves as surge capacity, [22, p. 3] however, staffing shortages have significantly hindered operations at ODPM. ODPM informs and coordinates through the Ministry of Foreign and CARICOM Affairs regarding relevant engagement with international DM partners. [23] However, the absence of a communications department is known to cause information management problems in supporting other agencies; this is especially problematic in the event of a disaster. [23] ODPM has a fully centralized operation without sub-divisions (i.e., regional offices), regionalization is supported and maintained by the MRDLG. The military is formally integrated into the civil DM structure. Integration of DRR, CCA, and SD is in the planning stages at present.

INSTITUTIONAL ARRANGEMENTS
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity



Leadership Arrangements

- Disaster management leadership arrangements
- Percentage of leadership positions filled
- Requirements for job-specific competencies for disaster management leadership
- Linkage of disaster management leadership to political leadership
- Leadership structure during major disaster response events
- Disaster management committee structure to support response and recovery operations
- Special disaster risk management policy-making committees
- Diversity of stakeholder groups represented in committees

Emergency management leadership is a shared responsibility across three main organizations, each reporting to different ministries or agencies. Because there is no single entity in charge of all DM and DRM processes, the functions of leadership, coordination, DM, and DRM are not well delineated. Whilst competencies and experience are not required, they are generally expected of leadership with DM positions. There are no formal procedures concerning the appointment or ensuring incident-specific proxy leadership during major events such that centralized leadership is maintained during concurrent incidents. Special interministerial decision-making committees for response and recovery operations are in place under the Prime Minister that operate through the National Emergency Operations Center (NEOC). [24, p. 47], [25] Nevertheless, key institutional responsibilities necessary for ensuring an adequate level of risk identification have not been defined. [24, p. 37] There is a need for more multi-stakeholder engagement with critical technical responsibilities.

INSTITUTIONAL ARRANGEMENTS

SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Mechanisms for Stakeholder Engagement

- Nongovernmental stakeholders represented in governmental disaster management structure
- Public-private partnerships
- Inventory of NGO and private-sector disaster management capabilities
- Capacity of nongovernmental stakeholders engaged in disaster management
- Engagement of private sector entities in disaster management
- Organizational arrangements used by NGOs to support disaster management efforts
- Involvement of academia in disaster management efforts
- Relationship between national governments, regional entities, and global disaster management organizations

Whilst nongovernmental DM stakeholders regularly support governmental DM response efforts, no official national recognition of such roles exists in organizational arrangements, nor have their contributions in disaster response been well documented. From a national standpoint, there are no known formal or informal working arrangements between NGO stakeholders and the government. This is true despite the call for direct engagement with nongovernmental stakeholders in plans and policies. Notwithstanding the absence of national arrangements, the Trinidad and Tobago Red Cross Society (TTRCS) participates in disaster preparedness and response alongside municipal corporation DMUs, and the Tobago Disaster Management Committee includes government, NGO, and private sector partners. However, they do not meet on a regular basis. [26] Similarly, the private sector has active engagement through sectoral and individual hazard contingency plans, but those plans are not integrated into a formal national response or contingency plan. Similar to the nature of NGO and private sector engagement, academia supports DM efforts but has no official association with government DM structures with the exception of the Seismic Research Unit at the University of the West Indies (UWI).

Robust engagement does exist with international organizations, especially CDEMA, a regional inter-governmental agency for DM in the CARICOM.

ENABLING ENVIRONMENT

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Disaster management structures, authorities, processes, and capabilities are enabled by a country's legal, institutional, financial, and social instruments. These rules, laws, policies, and other parameters allow capacity to develop and to achieve an effective risk reduction vision. The DMA analyzes six sub-themes that characterize an enabling environment and form the core of an effective disaster management framework. This includes a range of topics from the existence and applicability of legislation to disaster management stakeholders' attitudes and experience.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

Trinidad and Tobago's current enabling environment for DM has some achievements with significant limitations.

The primary legislation governing DM is brief and dated. It cursorily addresses compensation, liability, authority, and powers given to those responsible to respond to a disaster. [27], [28]

There is currently no dedicated budget, nor is a disaster reserve fund supported. Funding is inadequate to meet DM needs; a major disaster would require external financial assistance. [17] Consequently there is no recurring national budget to support capacity development efforts for lower-level jurisdictions. ODPM provides staff and community training through mostly external funding.

ENABLING ENVIRONMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Actions needed to achieve advanced capacity:

Update legislation to address comprehensive DM

Legitimize ODPM's role as the central coordinating agency

Establish a dedicated DM budget to include contingency and preparedness funds

Require disaster assessments to be part of the declarations process

Assess household preparedness levels, enhance public perception of DM activities, and ensure citizen participation

Strengthen the catastrophic risk insurance market

ENABLING ENVIRONMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Legal Instruments

- Legal arrangements for disaster management requirements
- Completeness of legislation to support all phases of disaster management
- National basis for disaster management legislative process
- Implementation schedule for legislation
- Legal foundation for the establishment of disaster management institutions
- Legal establishment of disaster management budgets
- Level of socialization of disaster management legislation throughout government
- Formalized legislative process, cooperation mechanisms and means to acquire human and material resources during disasters.
- Scope of legislative requirements related to a State of Emergency declaration
- Legal requirements for disaster management structures at sub-national levels of government
- Legislative guidance and support to disaster risk reduction activities and requirements
- Legal authority of military in support of disaster management activities
- Legal foundation of international and cross-border disaster management engagement to include participation in regional and international disaster management frameworks

The primary legislation governing DM in Trinidad and Tobago is the Disaster Measures Act Chapter 16:50, Act 47 of 1978. Several subsidiary statutes that govern specific aspects of Comprehensive Disaster Management (CDM) have been passed. However, ODPM has acknowledged that the existing regulatory framework for DM is "spread far and wide throughout Trinidad and Tobago's pool of legislation."[28] Stakeholder interviews and desk research revealed more than seventy (70) pieces of legislation including laws, guidelines, regulations, and governing documents related to DRM in the country. Notwithstanding the profusion of mandates, the DM statutory environment does not address all DM phases sufficiently, is largely reactionary, and makes no provisions for DM budgets. Moreover, there are no strategic requirements for the implementation of the DM legal provisions that do exist.

There is no national regulation that establishes a framework of responsibilities for DM and DRM, although there are multiple regulations that assign DM/DRM responsibilities. Basic legislation provisioned for the establishment of ODPM, TEMA, and DMUs. [24, p. 33] Legislation for the imposition of restrictive action during a state of emergency does exist in Trinidad and Tobago. Some provisions exist in the legislation that guides or supports DRR activities and requirements, however the existing legislation, especially concerning land use regulations and the environment, is in dire need of updating.

ENABLING ENVIRONMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Financial Resources

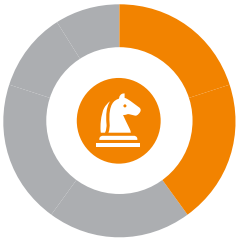
- Budget arrangements for disaster management
- Compliance with disaster management funding and legislation targets
- Scope of the disaster management budget
- Role of grant programs to support preparedness and disaster risk reduction programs at all sub-national and local levels of government
- Inclusion of training, education, and research and development in the disaster management budget
- Inclusion of funding to support capacity development at lower jurisdictional levels
- Existence of dedicated emergency or contingency funds
- Current level of disaster management budget support
- Existing disaster reserve fund restrictions
- Status of a catastrophic risk insurance market
- Role of the public sector to regulate the insurance market to address market solvency
- Availability of low-interest loan availability to support households, business, or NGO recovery
- Government support for disaster microfinance
- Guidelines for the provision of disaster relief funds to impacted jurisdictions.

The DM budget exists as a subcomponent of an agency-level budget, and not as a general budget line item. There is a budget category that corresponds to natural disasters but there is no description of the types of expenditures [24, p. 34]. ODPM's agency budget is provisioned under the MNS budget that covers its personnel and operational costs. TEMA's budget is under THA. For disaster response and immediate recovery, local governments outline what they need in their budgets and the Cabinet can approve a total figure for immediate funds via the MOF. A disaster reserve fund is not supported since there is no dedicated national DM budget. A catastrophic risk insurance market exists, however it is in its infancy. Microfinance credit schemes and expedited remittances are not adequately supported by the government. Furthermore, loan programs are only provided to a limited audience and are not well-established.

The lack of a dedicated DM budget means that there is no recurring national budget to support capacity development efforts of lower-level jurisdictions. ODPM provides staff and community training through mostly external funding. For example, certified USAID instructors provide DM training within the country [15]. There are regional DRM and DRR grant programs, but they are limited in scope and amount.

ENABLING ENVIRONMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity



Strategies

- Existence of disaster management and disaster risk reduction strategic plans and policies
- Engagement of disaster management stakeholders in the development of strategic plans
- Level of guidance and oversight provided to disaster management stakeholders
- Policy support for the integration of disaster risk reduction
- Integration of disaster risk reduction and disaster management policies across government
- Integration of mitigation planning into DRR policy instruments
- Inclusion of gender and vulnerable groups in DM and DRR strategies and policies

DM and DRR strategic plans and policies are either in draft form or are more than 10 years old. Recovery is largely missing from plans; hazard mitigation is also missing in many sectoral and local plans. Methodologies for the development of DRR projects often occur in silos and remain unshared amongst stakeholder agencies. [29, p. 94] Moreover, there is a general absence of explicitly defined DRM responsibilities in sectoral and territorial regulations. Hence there is a need to mandate DM institutions to implement specific mechanisms for civil society and NGO participation and a need for the definition of specific responsibilities, functions, and institutional arrangements for the planning and implementation of pre- and post-disaster recovery actions. [24, pp. 34, 61–62]

Regulations for the integration of comprehensive DRR and CCA are lacking at both sub-national and national levels. [24] National policies and plans do not adequately cover reconstruction. DRR through code enforcement is lacking. Provisions exist in DRR policies for mitigation planning, but requirements are vague or unspecific, and/or enforcement mechanisms do not exist. Some DM and DRR strategies and policies address gender issues and vulnerable groups. However, there are no policies that speak specifically to the care of special needs groups in emergencies and there is generally a lack of data on the location and particular needs of such groups. [30, p. 64]

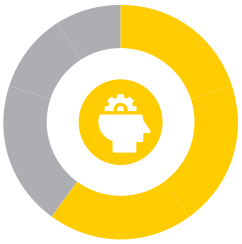
ENABLING ENVIRONMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Public Confidence and Political Support

- Level of support from top government officials for disaster management and disaster risk reduction efforts
- Existing committees to address disaster management and disaster risk reduction
- Integration of inter-agency and multi-stakeholder input into legislative process
- Public support for disaster risk reduction provisions
- Public confidence in disaster management agency capabilities
- Influence of political approval ratings on disaster management decisions

Substantial evidence of the championship of DM and DRR by top government officials was not evident in the research performed. There are no standing committees facilitating legislative action on DM and DRR other than the special interministerial decision-making committees who participate in response and recovery operations, and legislative processes can be slow.



Attitudes and Experience

- Practical disaster management experience at the individual, subnational and national level
- Level of public engagement with disaster management efforts
- Private sector participation in disaster management efforts
- Assessments of household preparedness

Each DMU has at least one Community Emergency Response Team (CERT) team with training from Municipal Corporations and facilitators from the Red Cross in Search and Rescue (SAR), First Aid, shelter, simulations, and exercises. [18] ODPM and the MRDLG provide public awareness, education, disaster preparedness and resilience training to the most vulnerable communities throughout Trinidad and Tobago. [29, p. 131] The general public is engaged through disaster preparedness education programs, training, and education; nevertheless, the public is unsure of the capabilities and capacity of DM agencies. Moreover, making the case to the public for prioritization of DRM and DRR has been a challenge for national stakeholders. The business community promotes business continuity planning and emergency planning among members, but businesses do not participate in community DM efforts.

DISASTER GOVERNANCE MECHANISMS

SUB-THEME STATUS

Limited or No Capacity
Early Capacity Development
Achievement with Significant Limitations
Substantial Progress with Some Limitation
Advanced Capacity

Disaster management efforts are most effective when guided by standard, formalized systems and procedures that dictate how and by whom activities are conducted. The effectiveness of all disaster management phases, including disaster preparedness, hazard mitigation, response, and recovery, is dependent on the establishment and documentation of such mechanisms. The DMA analyzes each of these mechanisms, or sub-themes, within the context of the country, including governance infrastructure which focuses primarily on emergency operations and incident coordination centers.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

Trinidad and Tobago's current disaster governance mechanisms have clear achievements with significant limitations.

DRR, mitigation, and response phases are addressed through formalized plans and SOPs. However, no formal governmental plans or SOPs exist that address disaster recovery and reconstruction. [24, p. 34] At the international level, processing external resources (i.e., customs and immigration) is facilitated, but not streamlined during disasters.

Regional Corporations have their own EOCs under the MRDLG that manage field-level coordination. [31] MRDLG is responsible for long-term community recovery and is supported by ODPM when needed. However, ODPM, MRDLG, and DMUs at the Regional Corporations are currently understaffed and require additional funding for the development of Disaster Resource Centers, including response and recovery equipment and supplies. [32]

DISASTER GOVERNANCE MECHANISMS

SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Actions needed to achieve advanced capacity:

- Continue efforts to equip the NEOC with required technology and properly credentialed staff to ensure uninterrupted operations
- Update SOPs and the response framework on a regular basis
- Ensure SOPs and plans are coordinated across all DM agencies and across sectoral plans
- Develop and update short- and long-term recovery plans
- Strengthen collaboration between ODPM and TEMA to include common operating protocols and information sharing
- Enhance interagency coordination through interagency agreements, mutual aid agreements, mission assignments, requests for assistance, reporting mechanisms, and reimbursement

DISASTER GOVERNANCE MECHANISMS
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
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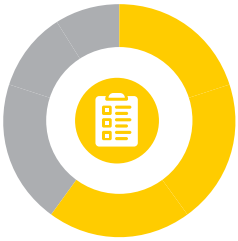

Plans and Standard Operating Procedures

- Inclusion of all phases of disaster management in plans and procedures
- Level of coordination across government to support disaster management plans
- Inclusion of Continuity of Operations and Continuity of Government in plans and procedures
- Clarity of roles and responsibilities in existing plans and procedures
- Level of accessibility of plans and SOPs
- Coordination and crosswalk of minimum disaster management requirements at every level of government.
- Adoption and implementation of formalized mutual aid agreements at all levels of government to support disaster management efforts
- Clarity in process and protocols to activate and integrate external disaster assistance
- Clarity and functioning of existing protocols to process, accept, and utilize donated goods and volunteer resources

Multiple agencies with DM functions have disparate plans that are not coordinated. Moreover, plans and SOPs do not identify the roles and responsibilities of lower levels of government. The government provides DM planning guidance to stakeholder communities but does not promote or require plan coordination. Some but not all plans and processes are publicly available on the ODPM, TEMA, MNS, MRDLG, and other government agency websites. Regarding Continuity of Operations (COOP) and Continuity of Government (COG), planning guidance is provided to government agencies, but plans are not required.

Formal mutual aid agreements have been established at the bilateral/global and regional level, but whilst mutual aid agreements do exist at the subnational or local level, they are often informal, unwritten, or unsigned. The utilization of donated goods and volunteer resources is managed through informal processes. Regarding declarations, the process is defined in DM Plans and SOPs; declarations must follow the defined procedures. However, at the international level, processing external resources (i.e., customs and immigration) is facilitated, but not streamlined during disasters.

DISASTER GOVERNANCE MECHANISMS
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
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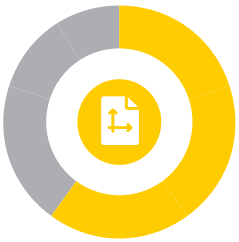


Command, Control, and Coordination Systems

- Operationalization of existing incident command systems in response to disaster operations
- Existence of explicit legal and planning instrument to define the incident command and management systems and structures
- Clarity of plans and procedures on the roles and responsibilities including decision-making authorities and reporting hierarchies of the incident coordination system
- Adoption of a functional approach to planning, coordination, and response support
- Facilitation of interagency coordination during all phases of disaster management

Incident command and management systems and structures, including decision-making authority and reporting hierarchies, are not explicitly defined in legal and planning instruments. Nonetheless, an Incident Command System (ICS) has been incorporated as a component of disaster response operations, but it is only used in large events or by some jurisdictions. ODPM facilitates interagency coordination through informal mechanisms such as the NEOC and the National Response Framework (NRF). The NEOC SOPs and the NRF outline the Emergency Support Functions (ESFs) of each of the lead ministries and agencies involved in the disaster response process. While the NEOC SOPs provide an ESF hierarchy chart, it does not define the leadership and coordination requirements of the ESFs.

DISASTER GOVERNANCE MECHANISMS
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Emergency Operations Centers

- Support for and existence of jurisdictional sole-use, purpose-built EOCs
- Existence of dedicated EOC facilities
- Minimum standards for EOC equipment and operationalization
- Policy and practice for minimum time to full EOC activation
- Duration of EOC operations with existing, staff, equipment, and resources
- Mitigation protection implemented for primary EOC from known hazards
- Accessibility of the national EOC to key government officials
- Existence of primary and secondary EOCs
- Establishment of field-level coordination centers
- Establishment and clarity of plans and procedures to support long-term community recovery
- Communications interoperability that has been established and validated across all of government
- Existence of a training and credentialing system that allows for the tracking and easy notification of human resources so they may be called upon during times of disaster.

ODPM's NEOC is a self-contained, self-sufficient facility that can operate independently for a reasonable amount of time with its own electrical generator and is capable of activation within six hours of incident onset. [32] The NEOC is operational but requires updates and additional resources. The alternate NEOC in Mausica is a stand-alone facility under the management of ODPM and becomes operational with a national level emergency of Level 2 or Level 3. [33, p. 2] TEMA maintains the Tobago Emergency Operations Center (TEOC) located at the Fairfield Complex in Scarborough, Tobago. The TEOC is a sole-use and purpose built EOC. [15] The TEOC is supplied with ad hoc emergency supplies and resources as well as emergency standby power, emergency water supply, and AccuWeather stations. [34] The primary NEOC at the ODPM main office in Tacarigua provides protection against all natural and manmade hazards. [35] It is not known whether the alternate NEOC in Mausica is physically protected from all hazards. The alternate NEOC in Mausica and the main NEOC in Tacarigua are both 45 minutes driving time from the government buildings in Port of Spain. [35] Partial communications interoperability exists, but communications capacity for DM is limited. Full communications interoperability is hindered by implementation challenges, including training on communication technologies and the inclusion of all relevant stakeholders.

CAPABILITIES AND RESOURCES

SUB-THEME STATUS

Limited or No Capacity
Early Capacity Development
Achievement with Significant Limitations
Substantial Progress with Some Limitation
Advanced Capacity

The nature and extent of skills, knowledge, supplies, resources, equipment, facilities, and other capacity components dedicated to meeting disaster management needs is an indication of a country's overall capabilities and resources. The DMA examines these sub-themes which include the source and size of surge capacities available in times of disaster, and broad array of disaster-focused functional capabilities like search and rescue, sanitation, and security.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

Trinidad and Tobago's current capabilities and resources for DM have some clear achievements with significant limitations.

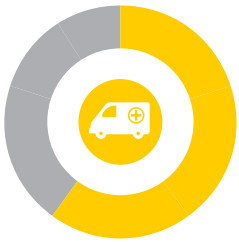
There is a need for supplemental DM resource and equipment requirements; some of these are secured through partnerships and relationships with the NGO sector. As of 2019, ODPM had only 30% of the necessary staffing required for its operations, which was acknowledged as a problem and was being actively addressed at the time. DMUs are also chronically short-staffed. [17] Similarly, MRDLG identifies staffing as a major issue due to a lack of funding. [36] Chronic funding shortages are also a major issue for maintaining sufficient levels of inventories. Public health and medical facilities are not fully integrated components of the nation's DM system.

Actions needed to achieve advanced capacity:

- Create and maintain rosters of trained professionals for critical post-disaster needs
- Leverage and expand existing NGO, private sector, and volunteer stakeholder agreements to address surge staffing needs
- Increase the number of emergency services facilities by building additional fire stations that cover the response needs (triple the number in the next ten years)
- Increase shelter inventory to address 100% capacity needs for anticipated disasters, and conduct suitability assessments for existing shelters.
- Formally integrate hospitals and public health entities into the national disaster management system leveraging lessons from COVID-19

CAPABILITIES AND RESOURCES
SUB-THEME STATUS

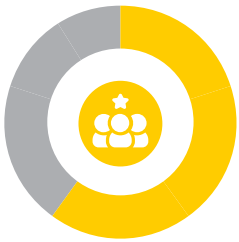
- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity



Dedicated Facilities and Equipment

- Capacity of jurisdictional emergency service facilities
- Status of maintained material resources designated to effectively respond to known emergencies and disasters in the given jurisdiction
- Access requirements to supplemental disaster management resources
- Maintenance and active management of disaster management inventories
- Status of shelter operations (suitability, maintenance, access, and equipment)

DMA findings determined that Trinidad and Tobago has an estimated one fire station per 60,000 people, and material resources designated for DM are maintained at inadequate levels across the two islands. Inventories of disaster-relevant equipment are inconsistently maintained. Agreements for mutual aid and resource sharing are in place via a Trinidad and Tobago Emergency Mutual Aid Scheme (TTEMAS) among the 14 municipalities/regional corporations and their DMUs. [37] Emergency shelters with the capacity to serve at least 50% of anticipated shelter needs have been identified, but alternate sheltering capabilities would likely have to be identified to address all requirements. Only a few shelters have been assessed for suitability and less than half of all shelters are specially equipped for disaster use. Purpose-built warehouse and staging facilities meet logistics operations requirements for a major disaster event.



Human Resources

- Dedicated emergency management staff
- Dedicated disaster/catastrophe planning and civil protection staff
- Plan and process for integrating surge/supplementary disaster management staffing
- Existing surge staffing sources and levels
- Accessible and updated list of critical post-impact professionals (e.g. building inspectors, engineers, debris removal, etc.)
- Mechanisms to easily activate disaster-related technical staff

As of 2019 Trinidad and Tobago had approximately one firefighter per 6,000 people. Surge staffing needs are formally addressed in disaster plans and procedures, but the adequacy of staffing resources has not been verified and is not at desired levels. Surge capacity staffing in DMUs and

for Level 1 events[1] are provided by volunteers. [15] Volunteers typically come from NGOs and faith-based organizations in the affected communities. Rosters of trained professionals are kept for some, but not all, critical post-disaster needs (e.g., building inspectors, engineers) and recovery efforts. The TTEMAS facilitates agreements between the 15 municipalities/regional corporations and their DMUs to address disaster-related technical staffing requirements.

Inventory of Commodities and Supplies

- Process and methods for generating post-disaster commodity needs estimates
- Maintenance of commodity stockpiles
- Location of commodity stockpiles
- Policy and process for distribution of commodities across service areas
- Current practice and maintenance of emergency contracts with providers for critical management-related commodities
- Policy for keeping disaster management resource and supply inventories
- Update frequency of disaster management resource and supply inventories
- Disaster management and supply inventory ownership and responsibility
- Status of a national disaster logistics program

The NRF dictates that ESF teams conduct post-disaster assessments, and that these assessments be used to update regional/municipal plans with estimates of post-disaster commodity needs (e.g., food, water, pharmaceuticals). However, noncompliance has been reported with regard to post-disaster and preparedness activities. [24, pp. 79, 82] Commodity stockpiles are maintained at levels that do not meet estimated needs; only a minimum number of supplies are stockpiled. [17] There are four subregional warehouses. ODPM's commodity stockpiles and disaster relief supplies are located in its main warehouse in Arima which also functions as a sub-regional warehouse for CDEMA and the United Nations (UN). [15] DM resource inventories are managed through multiple information systems and each agency maintains its own inventory, making coordination and correlation of information a challenge. A national disaster logistics capacity exists, with TEMA maintaining a disaster logistics program independently for Tobago, and ODPM handling the disaster logistics program for Trinidad. Implementation challenges persist at both national and sub-national levels.

[2] Level 1 emergencies are localized incidents that are within the capacity of the local government authorities and other first responder agencies to address. For detailed descriptions of operational Levels 1-3, refer to ODPM: http://www.odpm.gov.tt/node/66

CAPABILITIES AND RESOURCES
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
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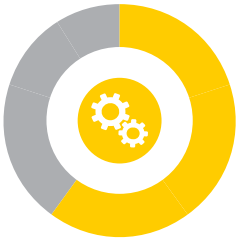


Targeted Functional Capabilities

- Support for psychosocial recovery
- National government capacity to support evacuations
- Current policy and capabilities to address post-disaster water, sanitation, and hygiene (WASH) needs
- Management of safety and security for disaster-affected populations
- Hazardous material (HAZMAT) response capacity
- National level search and rescue capabilities
- Agricultural preparedness, response, and recovery

The Ministry of Health (MOH), Ministry of Social Development and Family Services (MSDFS), and TTRCS all provide mental health services and support for psychosocial recovery. [38] However, DM professionals in the country have asserted that psychosocial first aid warrants greater emphasis in Trinidad. [18] Evacuation support capacity exists at the national level to facilitate the evacuation efforts of subnational and/or local governments, but challenges in execution remain. The Engineer Battalion of MNS is responsible for all search and rescue activities in the country. Post-disaster WASH is addressed in plans, and information regarding the mechanisms to support impacted areas is provided, however, full implementation is yet to be achieved. Procedures for safety and security responsibilities are defined and assigned to the appropriate ministry, office, or stakeholder, however, implementation challenges persist.

CAPACITY DEVELOPMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

The ability of nations to advance disaster management strategies that achieve risk reduction and resilience goals is ultimately dependent on their ability to support capacity development. From training and education that supports the advancement of knowledge and skills, to the institutionalization of appropriate attitudes and cultures, capacity development requires the continuous advancement of assessments, strategic plans, programs, facilities, and many other sub-themes. The DMA analyzes these sub-themes, looking at resources and opportunities for all stakeholders and all sectors, from individuals and special-needs groups to government responders.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

Trinidad and Tobago's current capacity development status for DM shows some clear achievements with significant limitations.

ODPM, TEMA, MNS, MRDLG, and TTRCS all conduct and support training, and all government agencies with DM functions are required to participate in disaster exercises. ODPM facilitates training through partnerships with organizations such as TTRCS, CDEMA, FEMA, and the UN. [39] However, neither a designated training facility nor training budget exists. Sub-jurisdictions are provided with limited technical, advisory, financial, and material support. No structured annual exercise schedule exists, nor does an annual training schedule and catalog. [32] Nevertheless, ODPM does conduct national-level exercises on an annual basis.

Limited DM and DRR curricula are provided for K-12 schools. Community centers and community organizations are engaged in the promotion of disaster awareness, preparedness, and training. However, these efforts are not conducted uniformly throughout the country. The private sector is provided with disaster preparedness and resilience information but not with financial or technical support.

CAPACITY DEVELOPMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Actions needed to achieve advanced capacity:

Establish position-specific competency requirements linked to hiring

Create a comprehensive DRM training and education curriculum inclusive of all DM stakeholders

Institutionalize training with a dedicated budget, staff, and a national training and exercise facility

Maintain systematic training records and common exercise evaluation standards to improve/update SOPs

Link the national Science and Technology (S&T) agenda to DRR/DM

Provide material, technical, and staffing support to subnational-level training and exercises

Develop DRM curricula for K-12 education

CAPACITY DEVELOPMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

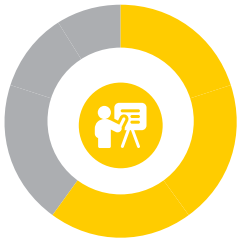
Capacity Development Plans and Strategies

- Formalized and established training and exercise requirements
- Formalized and established position-specific competency requirements
- Coordination process for the development of disaster management capacity
- Existing disaster management and disaster risk reduction capacity plans
- Process for assessment of disaster management and disaster risk reduction capacity resources
- Coordination of disaster management and disaster risk reduction efforts with regional and global efforts
- Inclusion of disaster management and disaster risk reduction in the national science and technology agenda

ODPM functions as the lead coordinating agency for DM capacity development efforts within communities, government agencies, NGOs, and the private sector. The ODPM Strategic Plan (2010-2015) and the National Institutional and Capacity Assessment (NICA) Report (2013) include DM and DRR strategies aimed at strengthening capacity development efforts. DM and DRR capacity and resource needs assessments are conducted, but not according to any defined schedule or planning process. As a member country of CDEMA and CARICOM, the government coordinates its DM and DRR capacity development efforts with these regional organizations. [40] For staffing, recommended position-specific competencies have been identified but do not serve as a requirement for employability for open positions, nor are they associated with any training or education strategies. The national science and technology agenda is captured in Trinidad and Tobago's Vision 2030 National Development Strategy 2016-2030 and addresses DM and DRR needs. [41]

CAPACITY DEVELOPMENT
SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity



Training and Education Programs and Facilities

- Jurisdictional disaster management/disaster risk reduction training
- Scope of disaster management/disaster risk reduction training and education
- Standard training delivery methods
- Existence of training schedule and/or catalog
- Maintain training records
- Level of exercise program implementation and staffing
- Exercise evaluation standards
- Structured annual exercise schedule
- National-level exercises
- National support for provincial and regional exercise efforts
- Participation of government agencies with disaster management functions in the exercise process
- Disaster management stakeholder involvement in training and disaster exercises
- Higher-education support for disaster management
- Higher-education offerings
- National support for public preparedness through an established disaster management curriculum
- Existence of a formalized public awareness and resilience building programs

Trinidad and Tobago's DM and DRR training and education curriculum is built on the core DM phases and support operational and functional needs, but implementation challenges exist. Training is provided through geographically distributed in-person training facilities, centralized in-person training, mobile staff outreach to communities throughout the country, and via online and virtual methods. Training records are maintained but not in a centralized system. Exercise evaluation standards exist, but they are not commonly applied. No structured annual exercise schedule exists, nor does an annual training schedule and catalog. [32] Nevertheless, ODPM does conduct national-level exercises on an annual basis.

Higher education support of DM professionalization is very limited: the highest education offering is a 12-credit graduate certificate in Disaster Risk Management and Resilience from the UWI Open Campus site in St. Augustine, Trinidad. Limited DM and DRR curricula are provided for K-12 schools. Formal public awareness, preparedness, and resilience-building programs exist and are provided, but encounter implementation challenges.

Monitoring and Evaluation Processes and Systems

- Procedures to guide the evaluation and revisions of plans, strategies, and SOPs
- Established review periods plans, strategies, and SOPs
- Established process to review and update disaster management legislation
- Requirements for post-disaster review and evaluation
- Incorporation of evaluations into plans, policies, and SOPs

Updates to plans, strategies, SOPs, and procedures occur on an ad hoc, as-needed basis depending on the availability of staffing resources. [32] They are not regularly reviewed, and no revision schedule exists. DM legislation is reviewed and updated only after major disaster events or developments. Post-event reviews occur after all major disaster events. Following every activation, exercise, or incident an After-Action Review takes place inclusive of internal and external participants to identify gaps and take corrective measures to address them. However, there is no evidence showing that the evaluations have been incorporated into plans, policies, and SOPs. [42]

COMMUNICATION AND INFORMATION MANAGEMENT SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Disaster management is a risk-based endeavor, and as such the capacity of stakeholders to generate, manage, and share risk and incident-related information is critical. This area of analysis looks at the systems, processes, and procedures that have been established to inform pre-and post-disaster activities. From hazard mapping, to event monitoring, to warning and notification, communication and information management sub-themes address a broad range of topics that highlight effective practices.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

Trinidad and Tobago's communication and information management capacity for DM shows some clear achievements with significant limitations.

Risk assessments are not completed on a regular basis, thus cannot adequately inform development or decision-making processes. [15] Coordination of hazard monitoring and communication occurs, but coordination activities are still maturing. Hazard monitoring benefits between 25% and 75% of the population. There is a lack of compliance in the implementation of assessment stipulations.

Media training on disaster-specific communication is provided only to lead DM officials and other DM staff, though no policy exists to enforce this. DM information-sharing occurs through disparate systems or platforms. There is a general lack of clarity regarding who is responsible for data gathering and collection and blurred agency roles and responsibilities.

Actions needed to achieve advanced capacity:

- Require risk assessment for DM and DRR planning efforts
- Expand and centralize hazard monitoring and alerts to match Sendai Framework commitments
- Expand public training/education programs for pre-disaster awareness
- Assign ODPM and TEMA Public Information Officers (PIOs) to coordinate information across all government DM functions
- Strengthen risk mapping
- Adopt national standards for DM data in fully digitized format fully shared with all stakeholders
- Develop sub-national hazard mapping

COMMUNICATION AND INFORMATION MANAGEMENT SUB-THEME STATUS

Limited or No Capacity
Early Capacity Development
Achievement with Significant Limitations
Substantial Progress with Some Limitation
Advanced Capacity

Hazard and Risk Analysis Systems

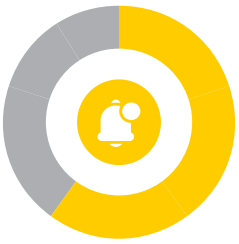
- Risk assessment processes and standards
- Requirements for risk assessments for disaster management and disaster risk reduction planning efforts
- Skilled staff and necessary resources to manage risk assessment needs
- Vulnerability inclusion in risk assessments
- Climate change inclusion in risk assessments
- Local and indigenous knowledge inclusion in risk assessments
- Risk assessment reporting systems
- Risk mapping requirements
- Risk mapping capacity
- The current relationship between risk assessment and development decision making

Risk assessments are not performed regularly and are mostly done on an ad-hoc basis focused on hazard impacts, and typically done when external funding is available. Outside assistance is required to perform risk assessments. Between 2016 and 2018, with support from the European Union (EU), the government conducted a Vulnerability and Capacity Assessment to address challenges and improve technical assistance in undertaking climate change vulnerability and risk assessments. [43, p. 9] No requirements exist for conducting risk assessments pertaining to DM and DRR planning efforts. Vulnerability assessment criteria are limited in scope; a general lack of available up-to-date data precludes the possibility of adequately measuring vulnerability. Local and indigenous knowledge is only partially included in risk assessments.

Risk assessments utilize GIS technology, but no centralized system exists to supports risk assessment reporting. Outside support is required to conduct risk mapping. Risk mapping requirements exist at the national level, but not at lower administrative levels.

COMMUNICATION AND INFORMATION MANAGEMENT SUB-THEME STATUS

Limited or No Capacity
Early Capacity Development
Achievement with Significant Limitations
Substantial Progress with Some Limitation
Advanced Capacity



Monitoring and Notification

- Hazard monitoring
- Coordination of hazard monitoring
- Population coverage of hazard monitoring
- Doppler Radar coverage
- Responsibilities for hazard monitoring activities
- Methods and technologies for hazard monitoring efforts
- Designated agency for the consolidation and notification of early warning communication
- Standard procedure for notification and early warning
- Communication of early warnings
- Risk-targeted early warning capabilities
- Early warning system coverage
- Testing protocols of early warning systems
- Education and training of populations served by early warning systems
- Inclusion of vulnerable populations in early warning system notification

The ODPM website lists an array of information, including capabilities and references related to hazard monitoring, and are largely from outside resources. All geographic areas affected by one or more major hazards are covered by monitoring and forecast systems, however, these systems do not factor in the potential for interrelated effects of multiple hazards. All of Trinidad and Tobago is covered by Doppler Radar. [44] Meteorological hazards are monitored in-country by the Trinidad and Tobago Meteorological Service, [44] while other hazards are monitored externally. The Meteorological Service acknowledged the need for improved technology to support more extensive hazard mapping [44]. TEMA and ODPM issue public alerts and warnings based on incident-related information received from authoritative sources. Notification and early warning messages are sent directly to the media and broadcasting networks for public broadcast. Early warnings are communicated by mobile (cellular) and landline phones, sirens, radio, television, and social media. Between 25% and 75% of the population is served by early warning systems. Warning alerts are disseminated at the national level due to the country's relatively small geographic footprint, and it is left up to residents to discern for themselves the applicability of the warnings to their locations. [31] The National Emergency Communications Plan contains detailed procedures on notifications and warnings, particularly for anticipated hazard occurrences such as hurricanes, severe storms, and floods [45, pp. 25–27]. Some, but not all early warning systems are tested, and not on a routine basis. Populations served by early warning systems are not provided with pre-disaster training or education about the meaning of warning messages or appropriate response actions. At the subnational level, early warning information is primarily communicated within and between communities. [31] It is not apparent whether warning systems have been fully adapted to meet the needs of populations with special needs.

COMMUNICATION AND INFORMATION MANAGEMENT SUB-THEME STATUS

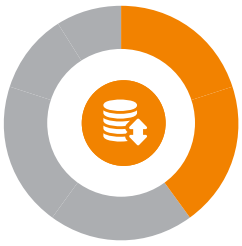
Limited or No Capacity
Early Capacity Development
Achievement with Significant Limitations
Substantial Progress with Some Limitation
Advanced Capacity

Disaster Assessment

- Disaster assessment capabilities
- Inclusion of disaster assessment requirements in the declaration process
- National assessment methodology
- Capacity to conduct assessments in the aftermath of major events
- Outcome-driven incident action plan
- Engagement of all relevant disaster management stakeholders in assessments

While a nationally authorized damage assessment methodology is not officially codified, there is evidence of a nationally accepted methodology in use through the ODPM's Damage Assessment Training partnership with the US Agency for International Development Office of Foreign Disaster Assistance (USAID-OFDA). ODPM may conduct one or more types of damage assessments, including an Initial Situation Overview (ISO), Initial Damage Assessment (IDA), Damage Assessment and Needs Analysis (DANA), or Damage and Loss Assessment (DALA). [46] Disaster assessments are regularly used to inform declarations decision-making, but are insufficient to adequately assess major disasters. Trinidad and Tobago relies on external partners to augment its assessment capabilities. The TTRCS disaster team typically conducts assessments over several days immediately following an event, including rapid assessments that serve to inform their subsequent operational strategy and Plan of Action.[47] Multi-stakeholder engagement is not required, but is typical.

ESF teams are required by the NRF to conduct post-disaster assessments, and subsequently update regional/municipal plans. Notwithstanding the efforts documented above, there is a lack of compliance in the implementation of assessment stipulations. For example, there is no evidence that a national assessment of the government's handling of any of the most recent major disasters has taken place.



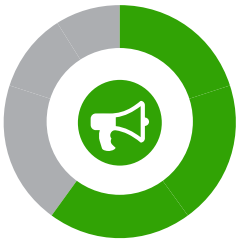
Information Collection, Management, and Distribution

- Data collection and storage standards
- Data format
- Data sharing
- Use of a GIS-based data management system for a common operating picture
- Linkage between disaster loss database and national statistics agency
- Disaster management information sharing

COMMUNICATION AND INFORMATION MANAGEMENT SUB-THEME STATUS

Limited or No Capacity
Early Capacity Development
Achievement with Significant Limitations
Substantial Progress with Some Limitation
Advanced Capacity

Collecting and storing reliable, up-to-date data remains a significant challenge for the country. [48, p. 11]With more than sixty-five (65) government organizations involved in the collection of data and no absolute authority for any one agency to enforce standards, reliable, up-to-date data (including in a standardized digital format) is not yet a reality for Trinidad and Tobago. [48, pp. 9–11] Because there is not a centralized database, data sharing is a problem, as it prevents coordinated action among agencies. [49] Data on losses attributed to disasters are collected, [50, pp. 15–31] however there is no national data management system for this information.[49]



Media and Public Affairs

- Designated Public Information Officer (PIO) position within disaster management agencies
- Documented communications strategy
- Dedicated media briefing space
- Media training for staff engaged in briefings
- Processes to obtain and disseminate public information in multiple formats and channels
- Development and deployment of pre-scripted information bulletins
- Scope of audience for public information capabilities
- Tracking of publicly generated information (social media)

The national disaster offices in both Trinidad and Tobago (ODPM and TEMA) have a PIO position in their organizational structure. The MRDLG also has a Corporate Communications Division. The ODPM headquarters in Tacarigua has a conference room that serves as a dedicated media briefing space. [51] Social media platforms and official websites of Government Ministries and State Agencies such as ODPM, TEMA, Meteorological Service, MRDLG, MNS, and the Red Cross Society are used to disseminate public information. However, social media information is not scientifically tracked, and no formal policy exists. [51] Free media such as the state television station (Trinidad and Tobago Television), [52] radio news stations, [53] and the three national newspapers (Guardian, [54] Newsday,[55] and Express[56]) are all used to disseminate public information. [51] There are no pre-scripted information bulletins for drought, fires, tsunamis, and landslides, biological, industrial, or climate change hazards. [51] ODPM does have pre-scripted information bulletins and brochures for flooding, [57] earthquakes, [58] and hurricanes. [59] Public information capabilities address a uniform audience in their methods and messaging to stakeholders. The government and ODPM have developed a Crisis Communications Guidelines and Response Plan (2011)[60] (currently still in draft form), and a National Emergency Communications Plan (2017). [45]

THE NDPBA

NATIONAL RECOMMENDATIONS

THE NDPBA

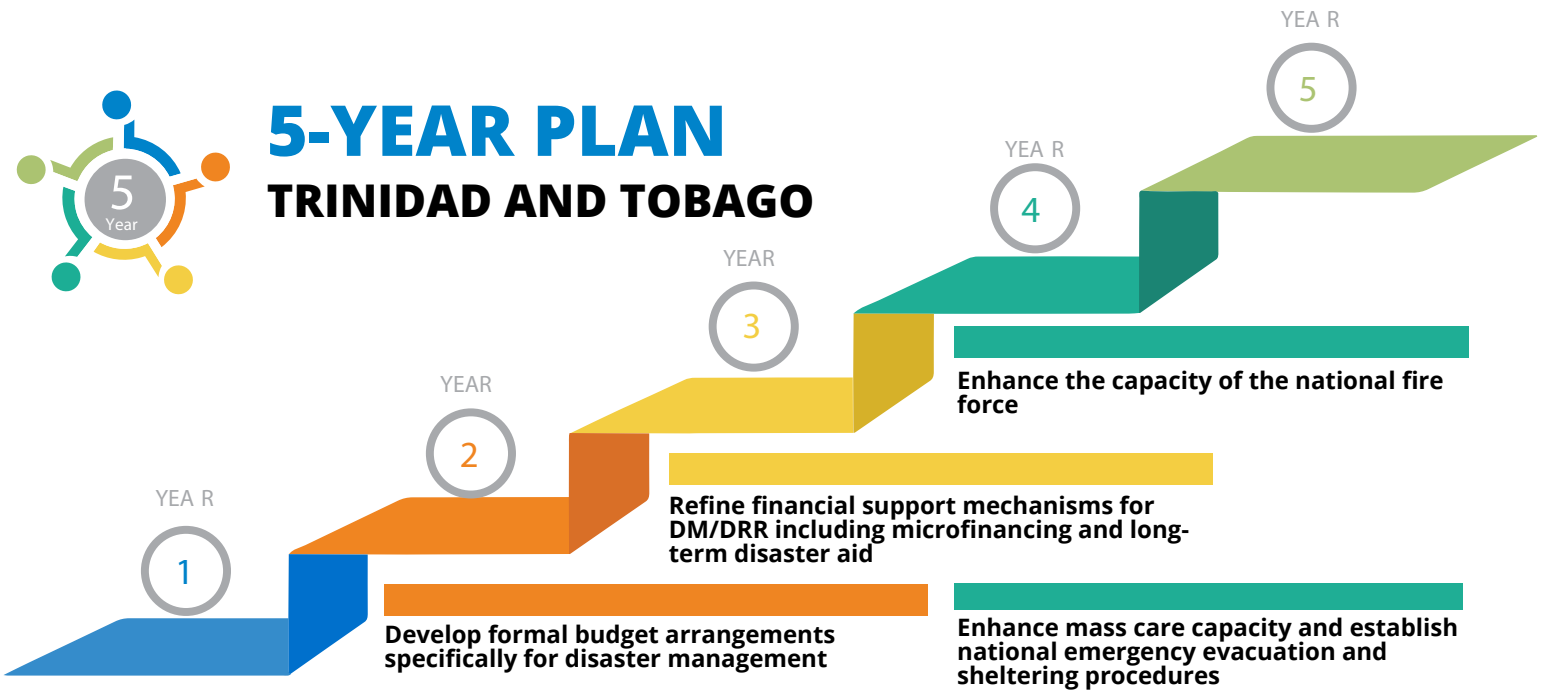
NATIONAL RECOMMENDATIONS

The following national recommendations are presented based on the findings of Trinidad and Tobago's National Disaster Preparedness Baseline Assessment, conducted by the Pacific Disaster Center in coordination with the Ministry of National Security and its Office of Disaster Preparedness and Management (ODPM). The recommendations focus on strengthening the culture of disaster risk reduction through comprehensive disaster management and good disaster-risk governance.

The recommendations below focus on strengthening the culture of disaster risk reduction through advancing the formalization and integration of DRM/DRR plans; strengthening disaster financing mechanisms; integrating NGO/private sector actors into key DRM/DRR activities; updating programs and policies to directly address vulnerable populations; centralizing the role of coordinating training and education for capacity development; expanding early warning, hazard monitoring, and information management capacity; investing in infrastructure and development projects to strengthen resilience to hazards and long-term climate impacts; and reassessing progress made toward DRM/DRR goals in order to build a safer, more disaster-resilient nation.

These recommendations, along with the 5-year plan, can be used as a roadmap to bolster DM and DRR efforts in Trinidad and Tobago, to deliver on its commitment to its citizens and residents, and to advance international targets under the Sendai Framework for Disaster Risk Reduction.

5-YEAR PLAN
TRINIDAD AND TOBAGO



Establish a comprehensive legal framework to enable ODPM as the fully-funded lead national agency

Develop formal budget arrangements specifically for disaster management

Refine financial support mechanisms for DM/DRR including microfinancing and long-term disaster aid

Enhance the capacity of the national fire force

Enhance mass care capacity and establish national emergency evacuation and sheltering procedures

Fully incorporate non-governmental stakeholders into DRM framework

Develop and regularly update plans and SOPs

Promote data collection, management, and sharing

Formalize incident coordination and emergency operations

Establish a national training and exercise program with ODPM as lead agency

Strengthen multi-hazard monitoring and early warning capabilities

Reduce disparities in infrastructure and Increase resilience nationwide by implementing physical and social resilience projects

Update the NDPBA

Develop and implement and expedited mechanisms to meet needs of disaster-impacted communities

Advance professionalization of DRM field through research and education programs

Institutionalize multi-hazard mapping and risk and vulnerability assessments

THE NDPBA
NATIONAL RECOMENDATIONS

1 ESTABLISH A COMPREHENSIVE LEGAL FRAMEWORK TO ENABLE ODPM AS THE FULLY-FUNDED LEAD NATIONAL DM AGENCY

1.1. Through legal provisions, empower ODPM with the flexibility and latitude to function effectively across all levels of government

1.2 Establish regional offices of ODPM to manage disaster events at the local level.

2 DEVELOP FORMAL BUDGET ARRANGEMENTS SPECIFICALLY FOR DISASTER MANAGEMENT

2.1. Prioritize the establishment of a dedicated budget for DRM/DRR through national policy to improve the enabling environment of Trinidad and Tobago's DRM/DRR operational capacity.

2.2. Establish funding targets and guidelines for DRM/DRR programming and implementation

- Through legislation, and in revisions to Trinidad and Tobago's strategic and emergency response plans, include detailed budgets for implementation of DRM/DRR activities. Allocate money under budget line items within existing contingency funds such as the Consolidated Fund and the Heritage and Stabilization Fund

3 REFINE FINANCIAL SUPPORT MECHANISMS FOR DM/DRR INCLUDING MICROFINANCING AND LONG-TERM DISASTER AID

3.1. Support and expand grant and loan programs, disaster insurance and microfinance credit schemes during disasters to mitigate dependency on social assistance programs

- Support and socialize the existing governmental subsidy loans and grant programs (e.g., MHUD housing repair, home improvement grants) by tying them to DRR policies including code compliance.
- Create affordable formal microfinancing mechanisms through Public-Private Partnerships (PPPs). Leverage existing disaster financing programs such as the UN Emergency Relief Fund, Caribbean Catastrophic Risk Insurance Facility, Inter-American Emergency Aid Fund (FONDEM), Caribbean Development Bank, and the Heritage and Stabilization Fund.
- Expand PPPs through the inclusion of key utility service providers such as the Telecommunications Service of Trinidad and Tobago (TSTT) in disaster risk reduction, risk governance, and disaster response mechanisms, and based on the COVID-19 pandemic experience, by leveraging these PPPs, instill resilience in education, finance, and small and medium enterprises with specific emphasis on vulnerable groups.

3.2. Strengthen financial and support services to assist growth and productive capacities of micro- to medium-scale business enterprises. Reduce the burdens of high-cost, high-collateral loans and complex application processes.

4 FORMALLY DEVELOP, INTEGRATE, AND REGULARLY UPDATE PLANS AND SOPS

4.1. Update and integrate all plans for a unified approach to DRR and DM

- Finalize the Disaster Preparedness and Response Bill, Comprehensive Disaster Management (CDM) Framework, and plans and policies such as NEMA/MNS SOP, National Emergency Communications Plan, National Volunteer Policy, Integrated Water Resources Management Policy, Shelter Management Policy, Flood Contingency Plan, Critical Facilities Protection Policy Framework for Trinidad and Tobago, Crisis Communication Guidelines and Response Plan, Structural Guidelines for Trinidad and Tobago, Designs Engineering Branch, Construction Division, Ministry of Works and Transport (MOWT) and Disaster Management Unit Disaster Preparedness Plans.
- Advance the Business Continuity Management Strategy for Public Service and individual sectoral plans to integrate COOP and COG initiatives more explicitly across all sectors, to promote quick recovery of critical services needed for the functioning of society and to ensure security.
- Establish guidelines for a regular evaluation, revision and formal adoption of plans, strategies, and SOPs, with stakeholder consultation to ensure coordination across all DM agencies and sectors. Update the existing SOPs for ODPM and TEMA.
- Integrate the existing municipal and local evacuation plans into a national evacuation plan in coordination with the MOWT, Trinidad and Tobago Police Service (TTPS), Trinidad and Tobago Defence Force (TTDF), ODPM, and TEMA. Integrate the shelter plans, volunteer plans and associated databases, and hazard mapping and early warning notification protocols into the national evacuation plan through input from stakeholders for a consistent approach.
- Make all DRM/DRR plans available online and publicly accessible.

4.2. Strengthen nationwide planning for functional capabilities to enhance effective disaster management

- Update policies, plans, and procedures for warehousing and inventory management. (The specific sections that address those functions in NRF and ODPM Strategic Plans are over 10 years old.)
- Enhance policies, plans and procedures to ensure critical functions necessary for a high performing disaster management organization. (Example: safety and security, water, sanitation, and hygiene (WASH), evacuation, crosscutting psychosocial support.)
- Enhance coordination, collaboration, and communication and cross-correlation of information across all response stakeholders to avoid resource wasting and duplication of effort.
- Continue to fund the modernization of individual ICSs of DMUs through an integrated approach for equipment and system interoperability across all levels of government and responsible agencies.

4.3. Foster comprehensive DM to address all-hazards, all DM phases and whole-of-society

4.4. Establish/strengthen a national platform for the implementation of the DRR provisions under the Sendai Framework and the CCA, and integration of DRR, CCA, and SD for all phases through stakeholder support and input

5 INTEGRATE NGO/PRIVATE SECTOR ACTORS INTO KEY DRM/DRR ACTIVITIES AT THE NATIONAL AND SUBNATIONAL LEVELS

5.1. Strengthen local government structures, institutions, and funding mechanisms to increase effectiveness and accountability in the implementation of DRM/DRR activities from national to local levels

- Continue to promote and expand the Ministry of National Security's (MNS) Citizen Security Programme (CSP) in high-needs communities to build public confidence and citizen support of measures to improve safety and security, and coordinate implementation of community-based crime prevention strategies.
- Expand national policies concerning youth to promote development and empowerment of young people, including reduction of risk factors (i.e., use of firearms, juvenile delinquency, domestic violence, child maltreatment, etc.)
- Strengthen partnerships between government and civil society organizations to implement programs that engage youth in violence reduction/prevention and promote rehabilitation rather than institutionalization of first-time offenders.
- Enhance policing resources and capacity to respond effectively to street gangs and organized crime groups.

5.2. Formally integrate the roles, resources, and capabilities of NGOs, private sector actors, and universities in the DM stakeholder community

- Officially recognize nongovernmental, private sector, and academic roles in DRM/DRR for disaster planning.
- Encourage the development of formal associations of established and active NGOs, with and without defined disaster management program areas or missions, in coordination with ODPM and TEMA.
- Engage the academic community of practitioners (e.g., UWI, others) to expand active contributions to official disaster management efforts through research and development and training using structurally integrated arrangements.
- Formalize the integration of nongovernmental, private sector, academic stakeholders including the National Disaster Management Committee (NDMC), a project board committee, a technical advisory committee, as well as the CDEMA and the UN in the governmental domestic disaster management structure.
- Expand PPPs through the inclusion of key utility service providers such as the Telecommunications Service of Trinidad and Tobago (TSTT) in disaster risk reduction, risk governance, and disaster response mechanisms, and based on the COVID-19 pandemic experience, by leveraging these PPPs, instill resilience in education, finance, and small and medium enterprises with specific emphasis on vulnerable groups.
- Advance the existing partnership with government, nongovernmental and private sector entities among ODPM, TEMA, MRDLG DMUs, CDEMA, TTRCS, TTEMAS, EMATT, as well as United Nations Children's Fund (UNICEF), World Food Programme (WFP) and others to meet warehousing and shelter needs.

5.3. Continue to support disaster management and DRR education and awareness-building activities and programs for communities

- Build on the successes of Trinidad and Tobago's advanced public education program. Consider CORE (Communities Organized and Ready for Emergencies), the 'Be Ready Trinidad and Tobago' Campaign, ODPM's national community-based flood mitigation project, and Red Cross Society's EMATT's Community Emergency Response Team (CERT) training as successful precedents for DM and DRR training and public education programs that support operational and functional needs.
- Expand disaster management surge capacity by leveraging existing schemes including the DMU CERT program and also by developing, training, and effectively equipping a reserve team representing a diverse group of stakeholders that can seamlessly integrate into operations.
- Incorporate household and individual disaster preparedness surveys and assessments into ODPM, TEMA, and DMU planning and operations, with staff trained and designated to assess adequate preparedness levels for the population.
- Strengthen engagement by the public in disaster management efforts at all jurisdictional levels through campaigns building public trust towards the government.

6 DEVELOP AND IMPLEMENT EXPEDITED MECHANISMS TO MEET NEEDS OF DISASTER-IMPACTED COMMUNITIES

6.1. Create/upgrade the national disaster logistics program

- Use scenario-based planning to anticipate needs and strategically locate commodity stockpiles where they are accessible within 24-48 hours from disaster impacted areas.
- Assess the material resources needed for emergency response through scenario-based planning and establish procurement and maintenance mechanisms at regional and subnational levels.
- Address DM resource requirements through formalized agreements/contracts involving PPPs, NGO sector and other stakeholders.
- Establish digital mechanisms to inventory and track materials, equipment, and supplies.

6.2. Enhance/update plans for WASH, safety, and security of disaster-impacted populations at the national and subnational levels with particular emphasis on the vulnerable, including elderly, disabled, women, children, refugees and low-income citizens

6.3. Formalize the disaster declaration process, vertical cooperation mechanisms, and conduct requisition of human and material resources during disasters

- Strengthen/empower subnational level DRM structures.
- Strengthen/facilitate international cooperation during disasters.

7 FORMALIZE INCIDENT COORDINATION AND EMERGENCY OPERATIONS

7.1. Establish a standalone NEOC that is accessible to government officials under "no notice" circumstances, and capable of continuous operations as needed

7.2. Establish a backup NEOC that has the same capabilities as the primary NEOC

7.3. Conduct structural assessments of the primary and backup NEOC and retrofit for physical hazards including seismic and weather-related hazards.

7.4. Continue efforts to equip primary and backup NEOCs with required tools, technology, and staff to ensure uninterrupted operations.

8 ENHANCE THE CAPACITY OF THE NATIONAL FIRE FORCE

8.1. Increase the number of emergency service facilities by building additional fire stations capable of covering the response needs of the country (triple the number in the next ten years)

8.2. Increase firefighting capacity by recruiting, training, hiring, and credentialling firefighters

9 ENHANCE MASS CARE CAPACITY AND ESTABLISH NATIONAL EMERGENCY EVACUATION AND SHELTERING PROCEDURES

9.1. Integrate local evacuation plans into a national evacuation plan, and enhance/update existing plans

9.2. Integrate the nation's public health and medical facilities with the DM system through training, drills, and policymaking to improve overall national disaster management system capabilities

9.3. Identify alternate sheltering options for the percentage of the population not covered by the existing shelter inventory and conduct a comprehensive assessment of shelter suitability to ensure shelters meet national standards as detailed in the ODPM Strategic Plan

- Enhance coordination between MRDLG and ODPM, Trinidad and Tobago Fire Services (TTFS), MOH, the MOWT, and local governments to prioritize inspection of shelters for suitability, ensuring they are adequately equipped, and addressing the gap in shelter inventory.
- Conduct inspections every three years as recommended in the strategic plan to ensure all established shelters meet National Standards for adequate space, building integrity, sanitation, sanitation facilities, location, and other needs.
- Modernize shelters with the help of regional and international organizations to equip them with the necessary material and human resources to function at minimum standards and adequately meet the demands of shelter populations, including women, children, disabled, and migrants.
- Integrate advanced technology to better track real-time shelter capacity on both islands.
- Establish and use scenario planning methods and After-Action Reports (AARs) required by ODPM for generating estimates of post-disaster commodity needs that are well-documented, transparent, equitable, and consistent with international standards.

10 ESTABLISH A NATIONAL TRAINING AND EXERCISE PROGRAM WITH ODPM AS LEAD AGENCY

10.1. Publish a training schedule and/or catalog for upcoming trainings and exercises in DRM/DRR to increase visibility of opportunities to engage the stakeholder community where appropriate and relevant

- Generate a list and description of available trainings and exercises to support wider DRM/DRR stakeholder coordination and open opportunities to build capacity among individuals and organizations across Trinidad and Tobago.
- Develop and maintain formal training and exercise SOPs, standards, plans, and policies that include training requirements and recommendations for relevant DM stakeholders.
- Establish a designated training facility for ODPM and TEMA along with an annual budget allocation for DM training, exercises, and education.
- Maintain training and exercise records and schedules in a centralized system.

10.2. Institute and expand training programs and exercise requirements and link to competencies not just in key leadership positions but for all relevant DM staff including the media

10.3. Partner with the Telecommunications Authority of Trinidad and Tobago (TATT) to implement training in communications technology (i.e., radio, satellite phones) for relevant stakeholders as recommended by the National Emergency Communications Plan

10.4. Continue to leverage resources from and include NGOs and Civil Society Organizations such as TTRCS, Adventist Development and Relief Agency (ADRA), CORE, Rotary Club, private sector groups such as Alliance for Disaster Resilience (ARISE), American Chamber of Commerce of Trinidad and Tobago (AMCHAM), and PPPs like TTEMAS and EMATT in disaster preparedness training and exercises.

11 ADVANCE PROFESSIONALIZATION OF THE DRM FIELD THROUGH RESEARCH AND EDUCATION PROGRAMS

11.1. Empower/integrate the efforts of academia to offer education programs at the bachelor's level and higher that support professionalization of DM

- Leverage existing resources in the academic community, NGOs, and Private Sector for data infrastructure development, and certification for the DRM/DRR sector.
- Engage local universities and other academic resources to boost capacity-building for emergency management training and education, professional development for individuals interested in the field, and research and development. Cipriani College, UWI's Seismic Research Centre, MRDLG Geomatic Unit, R&D funding available through oil companies, and scholarships offered by CDEMA and FEMA have been identified as academic resources that may be leveraged for community preparedness, a staffing pipeline for DRM/DRR agencies, and further advancement of DRM/DRR capacity.
- Develop a national DRM/DRR curriculum to be implemented at the K-12 level in schools to complement existing DRM/DRR national and local efforts. These efforts can complement the above DRM/DRR higher-education opportunities in Trinidad and Tobago. The existing CORE program, with the objective to engage with DRM/DRR at the community level, may be one possible venue for development and implementation of such a curriculum.

12 INSTITUTIONALIZE MULTI-HAZARD MAPPING AND RISK AND VULNERABILITY ASSESSMENTS

12.1. Establish risk and vulnerability assessment processes and standards at national and sub-national levels that incorporate indigenous knowledge and are factored into DM and DRR planning efforts

- Enhance risk mapping capacity and develop a centralized GIS system to support risk assessment reporting at the national and subnational level with adequate training of staff.

12.2. Establish a platform for sharing natural hazard risk and vulnerability assessment information

- Coordinate the development of a platform or central repository for the management and sharing of risk and vulnerability information such as hazard assessments, reports, maps and related data that have been generated by ODPM, DRM/DRR stakeholders, academia, and external agencies like the UN and Red Cross. Consolidation of these resources for increased access by DRM/DRR stakeholders will aid planning efforts at national and sub-national levels.

13 STRENGTHEN MULTI-HAZARD MONITORING AND EARLY WARNING CAPABILITIES

13.1. Expand Common Alerting Protocols across all government agencies in Trinidad and Tobago to include location-specific alerts for local hazards.

- Include the capability to disseminate location-specific alerts in the new early warning system under development by the Water and Sewerage Authority (WASA), Red Cross, and the Met Office. This would complement existing approaches to community-level warning such as "mic-ing," a Regional Corporation alert system that involves mobile broadcasts via microphones affixed to vans to warn communities about hazards.
- Leverage the ongoing Global Facility for Disaster Risk Reduction and Recovery (GFDRR) project on the regional Climate Risk and Early Warning Systems (CREWS) initiative working towards the development of a regional strategy to strengthen and streamline early warning and hydromet services and institutional capacity building.
- Update the Telecommunications Act to include provisions for responsibilities and controls with respect to the issuance of disaster alerts under the National Alert System (NAS) including a National Emergency Broadcast System (NEBS) and in relationship with the National Emergency Command Centre (NECC).

13.2. Centralize the coordination of hazard monitoring for alert notification/warning while maintaining the existing assignment of GoRTT agencies for specialized monitoring of hazards.

13.3. Strengthen efforts to expand hazard monitoring to match the Sendai commitments ("The entire population is expected to be served by hazard monitoring efforts by 2024.")

- Enhance early warning systems to target more than 75% of the population and adapt warning messages to vulnerable populations.
- Promote adoption and use of information and communications technology (ICT) among sub-sectors of the population such as the elderly, disabled, and those who are socially isolated to facilitate timely and effective receipt and dissemination of information before, during, and after a disaster. Leverage the existing campaigns such as TSTT.

14 PROMOTE DATA COLLECTION, MANAGEMENT, AND SHARING

14.1. Enhance overall communications infrastructure to provide universal access to robust telecommunication services.

- Expand the service area footprint and reliability of telecommunications services to bolster service delivery to existing customers and reach remote and underserved locations.
- Promote use of ICT among businesses to enhance economic capacity by providing funding and support for technical training programs implemented at the municipal level.

14.2. Develop and employ tools to track publicly-generated information (e.g., social media) and distribute ODPM-managed messaging during disaster response events.

- Leverage publicly-generated information through social media to aid with the ground truthing of disaster impacts; to build a common operating picture during response; and to understand public reactions to and perceptions of DRM/DRR policies and programming.

14.3. Digitize DRM/DRR data across institutions for more streamlined data management and sharing among agencies and within the stakeholder community.

- Establish and promote adoption of standards for data collection, management and sharing by ministries and stakeholder institutions (e.g., ODPM, MRDLG, Institute of Marine Affairs, MOWT, UWI, etc.) to inform important decision-making related to disaster management planning, urban and rural development, and delivery of social services.
- Improve public access to locally relevant hazard information to support community-based hazard awareness and preparedness campaigns to enhance disaster resilience.
- Upgrade ODPM website to include current and updated information on public campaigns on disaster preparedness, response, and recovery plans, legislation, easy access to partnering agencies and stakeholder organizations, and interactive hazard information/databases.
- Establish a common database for tracking inventories at national, regional, and municipal warehouses, to include a feature whereby requests and allocations are tracked in real-time to minimize duplicate and unnoticed requests for resources during a disaster emergency.

15 REDUCE DISPARITIES IN INFRASTRUCTURE AND INCREASE RESILIENCE NATIONWIDE BY IMPLEMENTING PHYSICAL AND SOCIAL RESILIENCE PROJECTS

15.1. Strengthen resilience by adopting a National Building Code with provision for seismicity

- Finalize a comprehensive building code that is based on universal guidelines, addresses all hazards, including seismic, wind and flood regulations, and is mandated across public and private infrastructure, including key facilities such as hospitals, schools, government offices, private sector, and residential housing.
- Provide guidance on code enforcement and compliance to local governments as well as budgets for implementation.

15.2. Strengthen resilience by improving access to clean water and sanitation

- Invest in clean water infrastructure enhancements, implementing risk reduction initiatives to protect infrastructure and water resources from hazard impacts.
- Given the prevalence of flood and landslide hazards in the country, institute measures to protect water supplies and reduce the risk to public health from untreated sewage.
- Strengthen collaboration between government, non-governmental partners, and social service agencies to address clean water and sanitation issues resulting from squatter settlements and the related potential health and environmental impacts.

15.3. Institute and enforce environmental policies and regulations regarding new development projects to reduce environmental impacts

- Launch national and local campaigns to educate the public about the harm resulting from the indiscriminate dumping of rubbish in waterways and locations other than designated disposal sites. Expand and communicate options for disposal and/or recycling of old vehicles, non-working appliances, and hazardous materials to minimize impacts on the environment and reduce random dumping.
- Empower local governments to improve levels of municipal garbage collection and management through the allocation of additional funding.
- Enhance transportation infrastructure capacity to improve efficacy of emergency management activities. Support the local economy through enhanced distribution of goods and services
- Strengthen public-private and multi-agency engagement in the planning and implementation of new transportation infrastructure to meet increasing traffic demand, expand into underserved areas and facilitate related infrastructure improvements (e.g., water, electricity, telecommunications).
- Secure investments for implementation of risk reduction measures in all transportation infrastructure improvements to alleviate hazard impacts, particularly those related to flooding and landslides.
- Develop comprehensive management plans for improvement and maintenance of road surfaces and drainage systems.

16 REASSESS PROGRESS MADE TOWARD DRM/DRR GOALS BY UPDATING THE NDPBA

16.1. Update the NDPBA, including both the RVA and DMA analyses, to track progress toward reducing vulnerabilities, increasing coping capacities, and building disaster management capabilities in support of Trinidad and Tobago's Disaster Risk Reduction and Sustainable Development Goals for a more resilient nation

NDPBA

MUNICIPAL RISK PROFILES

SUBNATIONAL ASSESSMENT RESULTS

Download Municipality Risk profiles:
https://www.pdc.org/wp-content/uploads/NDPBA-TTO-Municipal-Profiles.pdf

MUNICIPAL RISK PROFILES

Risk profiles developed for each municipality/regional corporation in Trinidad and Tobago offer a more detailed understanding of risk at the subnational level. Subnational profiles are available as a supplement to this report and describe drivers of vulnerability, coping capacity, and resilience at the municipal level; provide a relative comparison of each municipality within the overall country context; and offer strategic, data-driven, recommendations.

Each municipal recommendation looks at one of the top four drivers of resilience through the lens of the existing national disaster management structure in Trinidad and Tobago. Recommendations are designed to be concise, actionable, and supported by available data.

APPLYING RESULTS

Characterizing risk in terms of multi-hazard exposure, vulnerability, and coping capacity, the RVA provides necessary justification to support policy decisions that will protect lives and reduce losses from disasters. The RVA results allow decision makers examine the drivers of risk for each municipality in Trinidad and Tobago, providing evidence to support the identification, assessment, and prioritization of investments that will have the greatest impact on disaster risk reduction. The NDPBA RVA results establish a subnational foundation for monitoring risk and vulnerability over time and enhance the DRR decision making process through improved access to temporal and spatial data for all municipalities in Trinidad and Tobago.

NDPBA

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RVA METADATA

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Multi-Hazard Exposure			
Subcomponent: Raw Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Raw Multi-Hazard Population Exposure	Pacific Disaster Center	2020	Raw multi-hazard population exposure represents an estimation of the number of people exposed to one or more of nine hazards.

Notes

Hazard exposure zones:

Flood: For the Island of Trinidad, hazard zones were digitized based on Flood Susceptibility mapping developed by the Office of Disaster Preparedness and Management (ODPM) using Multi-Factor Modeling (MFM) based on rainfall, elevation, slope, drainage, road density, and land use. Analysis established five hazard severity classes (very low, low, moderate, high, and very high). Areas of 'moderate,' 'high' and 'very high' susceptibility to flooding were used as inputs for exposure analysis. For the Island of Tobago, hazard exposure was based on World Resources Institute (WRI) flood susceptibility maps for riverine flooding based on return period flooding for 10 return periods.

Earthquake: Hazard zones are based on seismic mapping developed by the University of the West Indies Seismic Research Centre for Trinidad and Tobago. Spectral acceleration values for a return period of 2,475-years were converted to Modified Mercalli Intensity (MMI). Areas exposed to earthquake shaking intensities of 'MMI VII and above' were used as inputs for exposure analysis.

Landslide: Areas susceptible to landslide were estimated using environmental inputs of slope, aspect, land cover, and proximity to roads, streams and faults. Susceptibility was classified on a relative scale. Areas of 'very high', 'high' and 'medium' susceptibility were used as inputs for exposure analysis.

Wildfire: Hazard zone was developed using active fire data collected by the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument operating on both the NASA Terra and Aqua satellites over the period November 1, 2000 to May 25, 2020. A weighted kernel density estimation algorithm was applied to the data set using fire radiative power (FRP). Areas showing 'high' fire density were used as inputs for exposure analysis.

Tropical Cyclone Winds: Hazard zone based on the Munich Reinsurance Company's (Munich Re) World Map of Natural Hazards Global Storm Intensity Zones derived by the U.S. Geological Survey's (USGS) HazPac Pacific Rim GIS (HAZPAC) development team. The dataset establishes five wind speed categories with a 10% probability of occurrence within the next 10 years. The five wind speed categories are: 1) 118-153 km/hr, 2) 154-177 km/hr, 3) 178-209 km/hr, 4) 210-249 km/hr, and 5) 250+ km/hr. Areas experiencing wind speeds of 118 to 153 km/hr were used as inputs for exposure analysis.

Coastal Flooding: Hazard zones for Trinidad and Tobago based on the terrestrial boundary of the coastal zone as defined by the Integrated Coastal Zone Management (ICZM) Policy Framework, 2019 were developed using Image Classification tools in ESRI's ArcMap. Areas approximating the Terrestrial Zone T1 were used as inputs for exposure analysis.

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Multi-Hazard Exposure			
Subcomponent: Raw Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Raw Multi-Hazard Economic Exposure	Pacific Disaster Center	2020	Raw multi-hazard economic exposure represents an estimation of the replacement cost of economic stock exposed to one or more of six hazards.
Notes			
Refer to hazard information above. Cumulative value of capital stock exposed to one or more of six hazards.			

Multi-Hazard Exposure					
Subcomponent: Relative Exposure					
Indicator	**Source(s)**	**Year**	**Description**		**Notes**
Relative Multi-Hazard Population Exposure	Pacific Disaster Center	2020	Cumulative raw count of person units exposed to multiple hazards, per capita.	See above for detailed description of hazard zones.	
Relative Multi-Hazard Economic Exposure	Pacific Disaster Center	2020	Cumulative value of economic capital stock exposed to multiple hazards, divided by total economic capital stock value of the municipality/ regional corporation.	See above for detailed description of hazard zones.	

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Vulnerability				
Subcomponent: Economic Constraints				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Households with no Vehicle for Private Use	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households without a vehicle for private use.	
Age Dependency Ratio	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Age dependency ratio per municipality/regional corporation.	
Percent of Population below Poverty Line	Kairi Consultants Ltd. 2005 Analysis of the Trinidad and Tobago Survey of Living Conditions, published 2007.	2005	Percentage of the population living below the poverty line, by municipality/regional corporation.	
Percent of Population with Unmet Housing Need	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Housing and Population Census data available via REDATAM webserver online at: https://cso.gov.tt/census/2011-census-data/	2011	Percentage of the population with and unmet basic need related to housing.	Criteria for Unmet Basic Need for housing include: crowding >= 3 persons per bedroom; outer walls = “wattle/adobe/tapia;” roof comprised of “thatch/makeshift;” or tenure type = “squatted.”

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Vulnerability				
Subcomponent: Access to Information Vulnerability				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent of Households with No Internet Access	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Housing and Population Census data available via REDATAM webserver online at: https://cso.gov.tt/census/2011-census-data/	2011	Percentage of households with no Internet access.	
Percent of Households with No Television	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Housing and Population Census data available via REDATAM webserver online at: https://cso.gov.tt/census/2011-census-data/	2011	Percentage of households with no television.	
Percent of Households with No Radio	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Housing and Population Census data available via REDATAM webserver online at: https://cso.gov.tt/census/2011-census-data/	2011	Percentage of households with no radio.	
Percent of Adults with Less than Secondary Education	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of non-institutionalized adults with less than a secondary education.	

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Vulnerability				
Subcomponent: Access to Clean Water Vulnerability				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent of Households with Improved Source of Water Supply	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households with improved drinking water services.	Improved water sources include those designated as: "public piped dwelling," "public piped yard," "public standpipe," "private piped dwelling," and "private catchment."
Percent of Households with Inadequate Toilet Facilities	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households with inadequate toilet facilities.	Inadequate toilet facilities are those designated as "pit latrine" or "none."

Vulnerability				
Subcomponent: Vulnerable Health Status				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent persons with Chronic Illness	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of the population with a chronic illness.	Survey responses: "chronic illness not stated," and "other chronic illness" were removed from the dataset.

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Vulnerability				
Subcomponent: Vulnerable Health Status				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent persons with long-standing Disability	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of the population reporting a long-standing disability.	
Population in Collective Living Quarters	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of the population living in collective living quarters.	
Infant Mortality Rate	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Housing and Population Census data available via REDATAM webserver online at: https://cso.gov.tt/census/2011-census-data/	2011	Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.	
Chikungunya Cases per 10,000 persons	Government of the Republic of Trinidad and Tobago Ministry of Health	2014-2016	Number of lab confirmed Chikungunya cases per 10,000 people, by municipality/ regional corporation.	Data available for Trinidad only.

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Vulnerability				
Subcomponent: Vulnerable Health Status				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Dengue Cases per 10,000 persons	Government of the Republic of Trinidad and Tobago Ministry of Health	2016-2018	Number of lab confirmed Dengue cases per 10,000 people, by municipality/regional corporation.	Data available for Trinidad only.
Zika Cases per 10,000 persons	Government of the Republic of Trinidad and Tobago Ministry of Health	2016-2017	Number of lab confirmed Zika cases per 10,000 people, by municipality/regional corporation.	Data available for Trinidad only.
Leptospirosis Cases per 10,000 persons	Government of the Republic of Trinidad and Tobago Ministry of Health	2017-2018	Number of lab confirmed Leptospirosis cases per 10,000 people, by municipality/regional corporation.	Data available for Trinidad only.

Vulnerability				
Subcomponent: Population Pressures				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Net Recent Migration Rate	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Crude net recent migration rate per 1,000 habitants.	
Average Annual Total Population Change	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2000 and 2011	Average annual percentage of total population change for the period 2000 to 2011.	

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Vulnerability				
Subcomponent: Environmental Stress				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent of Households Affected by Deforestation	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to deforestation, by municipality/regional corporation.	
Percent of Households Affected by Mangrove Loss	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to mangrove loss, by municipality/regional corporation.	Due to low range and very low values, this data variable was processed, mapped and included in DisasterAWARE, but not included in index calculations.
Percent of Households Affected by Drainage Issues	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to drainage, by municipality/regional corporation.	
Percent of Households Affected by Flooding	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to flooding, by municipality/regional corporation.	

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Vulnerability				
Subcomponent: Environmental Stress				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent of Households Affected by Sewerage Issues	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to sewerage, by municipality/regional corporation.	
Percent of Households Affected by Soil Erosion	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to soil erosion, by municipality/ regional corporation.	
Percent of Households Affected by Solid Waste	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to solid waste, by municipality/ regional corporation.	
Percent of Households Affected by Wastewater	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to wastewater, by municipality/ regional corporation.	
Percent of Households Affected by Water Contamination	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of households affected by environmental issues related to water contamination, by municipality/regional corporation.	

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Vulnerability				
Subcomponent: Gender Inequality				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Female to Male Secondary Education Attainment	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Proportion of female to male population who have attained a secondary school education.	
Female to Male Labor Ratio	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Housing and Population Census data available via REDATAM webserver online at: https://cso.gov.tt/census/2011-census-data/	2011	The ratio of females to males (ages 15 and over) that are working.	

Coping Capacity				
Subcomponent: Economic Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Labor Force Participation Rate	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Housing and Population Census data available via REDATAM webserver online at: https://cso.gov.tt/census/2011-census-data/	2011	Percentage of the non-institutionalized population participating in the labor force.	Derived from current activity status of the non-institutionalized population usually resident in Trinidad and Tobago. Includes those who had a job and worked, had a job but did not work, are seeking first job, or are actively seeking work."
Household Income per Capita	Vulnerability and Capacity Assessment (VCA) Report Trinidad and Tobago Table source: Central Statistical Office 2012b.	2008-2009	Household income per capita in US dollars for the year 2008-2009, per municipality/ regional corporation.	Data reflects the year 2008 to 2009, within two years of other demographic data used in the assessment.
Financial Institutions per 10,000 persons	Open Street Map - financial institutions; Humanitarian Data Exchange/Facebook for Good - population	2020	Financial Institutions (banks, credit unions, money agents, foreign exchange bureaus, and ATMs) per 10,000 persons.	

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Coping Capacity				
Subcomponent: Governance				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Voter Participation Rate	TTO Elections and Boundaries Commission - voter participation; Central Statistical Office (CSO) - population data	2016 and 2017	Estimated voter participation rate in recent local government elections, per municipality/ regional corporation.	Official results for Trinidad Local Government Elections held 28 Nov 2016, and Tobago House of Assembly Elections held 23 Jan 2017. Total Valid Votes for each municipality/ regional corporation were used in analysis. To estimate the percent voter participation for Trinidad, the total number of residents 18 years and older per municipality/regional corporation were used in calculations. Note: While more recent preliminary results were available for the 2020 General Election, inadequate data was available to accurately tabulate voter participation rates at the municipality/regional corporation level.
Percent Households with Unmet Need for Refuse Collection	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Housing and Population Census data available via REDATAM webserver online at: https://cso.gov.tt/census/2011-census-data/	2011	Percent of households with an unmet basic need for refuse collection.	
Crime Rate per 10,000 Persons	Crime and Problem Analysis (CAPA) Branch, Trinidad and Tobago Police Service, downloaded at: https://cso.gov.tt/subjects/population-and-vital-statistics/crime-statistics/			

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Coping Capacity				
Subcomponent: Environmental Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent Protected Area	UNEP-WCMC (2020). Protected Area Profile for Trinidad and Tobago from the World Database of Protected Areas, September 2020. Available at: www.protectedplanet.net	2020	Percentage of each municipality/ regional corporation that is designated as a protected area.	

Coping Capacity				
Subcomponent: Health Care Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percentage of Persons with Private Health Insurance	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of the population with private health insurance.	
Health Care Facilities per 10,000 persons	Health Facilities: TTO Ministry of Health; Population data source: Facebook. Available at: https://data.humdata.org/	2019	Number of health facilities per 10,000 persons.	Health Care Facilities includes hospitals, health centers, regional health authorities, municipality health facilities, etc.”

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Coping Capacity				
Subcomponent: Transportation Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Road Density	Roads - Open Street Map. Land area (sq km) - Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2020	Number of kilometers of roads per municipal/ regional corporation area (square km).	While railways would typically be included with roads for this indicator, all railways on the island of Trinidad were classified as “abandoned” and were therefore not included.
Average Distance to Port Facility	PDC, World Port Index, Humanitarian OpenStreetMap Team (HOTOSM)	2020	Average distance (in km) to the nearest airport or seaport for each province.	

Coping Capacity				
Subcomponent: Communications Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Mobile Phone Usage	Central Statistical Office (CSO), Ministry of Planning and Sustainable Development, Government of the Republic of Trinidad and Tobago. Trinidad and Tobago 2011 Population and Housing Census Demographic Report.	2011	Percentage of the population who used a mobile phone within the last three months.	
Mobile and Wireless Infrastructure per 10,000 Persons	Telecommunications Authority of Trinidad and Tobago	2019	Density of mobile stations and service towers, cell sites and towers, and wireless broadband towers per municipality/ regional corporation.	Select telecommunications infrastructure types included: fixed wireless broadband towers, in-building mobile stations, mobile service towers, pole-mounted cell sites, and rooftop cell towers.

APPENDIX A
RVA METADATA

Coping Capacity				
Emergency Services Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Distance to Nearest Fire Station	University of the West Indies (UWI) at St. Augustine Department of Geomatics Engineering & Land Management, Data gathered from UWI Enterprise GIS Online, Geospatial Information Research and Innovation (GIRI) https://uwi.maps.arcgis.com/home/index.html	2015	Average distance (km) to the nearest main fire station from populated area of each municipality/ regional corporation.	
Distance to Nearest Police Station	University of the West Indies (UWI) at St. Augustine Department of Geomatics Engineering & Land Management, Data gathered from UWI Enterprise GIS Online, Geospatial Information Research and Innovation (GIRI) https://uwi.maps.arcgis.com/home/index.html	2015	Average distance (km) to the nearest main police station from populated area of each municipality/ regional corporation.	
Emergency Shelters per 10,000 persons	Trinidad Shelter list: Office of Disaster Preparedness and Management (ODPM); Tobago Shelter list: Tobago Emergency Management Agency; Population estimates: Humanitarian Data Exchange	2020	Number of emergency shelters per 10,000 persons per municipality/ regional corporation.	Facebook population data was used for calculations.

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