PANAMA

NATIONAL DISASTER PREPAREDNESS BASELINE ASSESSMENT

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

PDC | GLOBAL

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- Sistema Nacional de Protección Civil (SINAPROC)
- Agencia Española de Cooperación Internacional para el Desarrollo (AECID)
- Autoridad Aeronautica Civil (AAC)
- Autoridad del Canal de Panama (ACP)
- Autoridad Maritima De Panama (AMP)
- Autoridad Nacional para la Inovacion Gubernamental (AIG)
- Caja De Seguro Social (CSS)
- Caritas Internationalis
- Centro de Coordinación para la Prevención de los Desastres en América Central y República Dominicana (CEPREDENAC)
- Centro Logístico Regional de Asistencia Humanitaria (CLRAH)
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- Instituto Nacional de Estadística y Censo (INEC)
- International Federation of Red Cross and Red Crescent Societies (IFRC)
- International Organization for Migration (IOM)
- Ministerio de Desarrollo Social (MIDES)
- Ministerio de Educaccio (MEDUCA)
- Ministerio de Medio Ambiente (MiAmbiente)
- Ministerio De Obras Publicas (MOP)
- Ministerio de Relaciones Exteriores (MIRE)
- Ministerio de Salud (MINSA)
- Ministerio de Vivienda y Ordenamiento Territorial (MIVIOT)
- Organización de las Naciones Unidas (ONU)
- Pan American Health Organization (PAHO)
- Plan International
- Policia Nacional
- Salvation Army
- Save The Children
- Secretaría Nacional de Ciencia tecnología e Innovación - Estudos Espaciales de Panama (SENACYT)
- Secretaria Nacional de Discapacidad (SENADIS)
- Servicio Nacional Aeronaval (SENAN)
- Servicio Nacional de Fronteras (SENAFRONT)
- Sistema Institucional de Salud para Emergencias y Desastres - Región Metropolitana de Salud (SISED)
- Sistema Único de Manejo de Emergencias (SUME 911)
- Tribunal Electoral
- United Nations High Commissioner for Refugees (UNHCR)
- United Nations International Children’s Emergency Fund (UNICEF)
- United Nations International Strategy for Disaster Reduction (UNISDR)
- United Nations Population Fund (UNFPA)
- Universidad de Panama - Instituto de Geociencias (IGC)
- Universidad de Panamá (UP)
- Universidad Tecnológica de Panamá (UTP)
- US Embassy Panama
- World Bank
- World Food Programme (WFP)
- World Vision

LIST OF ABBREVIATIONS

AAC: Autoridad de Aeronáutica Civil/ Civil Aeronautics Authority

ACP: Autoridad del Canal de Panamá/ Panama Canal Authority

ADALPA: Asociación de Alcaldes de Panamá/ Association of Mayors of Panama

ADRA: Adventist Development and Relief Agency

AECID: Agencia de Cooperación Internacional para el Desarrollo/ Agency for International Development Cooperation

AIG: Autoridad Nacional para la Innovación Gubernamental/ Government Innovation Authority

AMP: Autoridad Maritima De Panama/ Panama Maritime Authority

AMUPA: Asociación de Municipios de Panamá/ Association of Municipalities of Panama

ANA: Autoridad Nacional de Aduanas/ National Customs Authority

ANAM: Autoridad Nacional del Medio Ambiente/ National Environment Authority (now MINSA)

ANATI: Autoridad Nacional de Administración de Tierras / National Land Administration Authority

AND: Autoridad Nacional de Descentralización/ National Decentralization Authority

ANTAI: Autoridad Nacional de Transparencia y Acceso a la Información/ National Authority of Transparency and Access to Information

ARO: IFRC Americas Regional Office

ASEP: Autoridad de Servicio Público/ Public Service Authority

ASIS: Agricultural Stress Index System

ATP: Autoridad de Turismo de Panamá/ Tourism Authority of Panama

ATTT: Autoridad de Tránsito y Transporte Terrestre/ Traffic and Land Transportation Authority

B/.: Panamanian Balboa

BCBRP: Benemérito Cuerpo De Bomberos de la República de Panamá/ Meritorious Fire Department of Panama

BDA: Banco de Desarrollo Agropecuario /Agricultural Development Bank

BLB: Panama Pacifico International Airport (in Balboa)

C-5: Comando, Control, Computo, Comunicaciones y Calidad (Centro Nacional de Operaciones de Seguridad y Emergencia) / Command, Control, Computing, Communications and Quality (National Center for Security and Emergency Operations)

CAPAC: Cámara Panameña de la Construcción/ Panamanian Chamber of Construction

CAPADESO: Cámara Panameña de Desarrollo Social/ Panamanian Chamber of Social Development

CANATRACA: Cámara Nacional de Transporte de Carga/ National Chamber of Freight Transportation

CAPRA: Central American Probabilistic Risk Assessment

CARE: Cooperative for Assistance and Relief Everywhere

CATDDO: Catastrophe Deferred Disbursement Option (of the World Bank)

CATHALAC: Centro de Agua del Trópico Húmedo para América Latina y el Caribe/ Water Center of the Humid Tropics for Latin America and the Caribbean

CCA: Climate Change Adaptation

CCAH: Centro de Coordinación de la Ayuda y Asistencia Humanitaria/ Center for the Coordination of Humanitarian Aid and Assistance

CCRIF: Caribbean Catastrophe Risk Insurance Facility

CDRM: Comprehensive Disaster Risk Management

CEPREDENAC: Centro de Coordinación para la Prevención de los Desastres Naturales en América Central/ Center for the Prevention of National Disasters in Central America

CERF: Central Emergency Response Fund (of the UN)

CLRAH: Centro Logístico Regional de Asistencia Humanitaria/ Regional Humanitarian Assistance Logistics Center

COCATRAM: Comisión Centroamericana de Transporte Marítimo/ Central American Commission of Maritime Transport

COE: Centro de Operaciones de Emergencia/ Emergency Operations Center (See also EOC)

COEL: Consejo Empresarial Logístico/ Logistics Business Council

COG: Continuity of Government

CONACPP: Comité Nacional de Cambio Climático de Panamá/ National Climate Change Committee

CONARE: Coordinadora Nacional de Representantes de Corregimiento/National Coordinator of Corregimiento Representatives

CONE: Comité Nacional de Emergencia/ National Emergency Committee

CONEAUPA: Consejo Nacional de Evaluación y Acreditación de la Educación Universitaria de Panamá/ National Council for the Evaluation and Accreditation of University Education of Panamá

CONEP: Consejo Nacional de la Empresa Privada/ National Council of Private Enterprise

COOP: Continuity of Operations

COSUDE: Cooperación Suiza para América Central/ Swiss Cooperation for Central America

COVID-19: Corona Virus Disease 2019

CNCC: Centro Nacional de Coordinación de Crisis/ National Crisis Coordination Center

CRP: Cruz Roja Panamá/ Panama Red Cross

CSS: Caja De Seguro Social/ Social Security Fund

CSUCA: Consejo Superior Universitario Centroamericano/ Central American Higher University Council

CTC: Centro de Transferencia de Conocimiento/ Center for Knowledge Transfer

CTI: Oficina de Cooperación Técnica Internacional/ International Technical Cooperation Office

DANA: Damage Assessment and Needs Analysis (See also EDAN)

DG: Director General/General Director

DHL: Dalsey, Hillblom and Lynn (private corporation)

DICRE: Dirección de Inversiones, Concesiones y Riesgos del Estado/ Directorate of Investments, Concessions and Risk of the State (of MEF)

DIPECHO: Disaster Preparedness Program of European Commission Humanitarian Aid Department

DISAPAS: Dirección del Subsector de Agua Potable y Saneamiento/ Directorate of Water and Sanitation (of MINSA)

DM: Disaster Management

DPD: Despacho Primera Dama de Panamá/ Office of the First Lady

DREF: Disaster Relief Emergency Fund (of IFRC)

DRM: Disaster Risk Management

DRR: Disaster Risk Reduction

DRRM: Disaster Risk Reduction and Management

DRT: Disaster Response Team

DOW: Doctors of the World

ECHO: European Civil Protection and Humanitarian Aid Operations

ECLAC: Economic Commission for Latin America and the Caribbean

EDAN: Evaluacion de Danos y Analysis de Necesidades/ Damage Assessment and Needs Analysis (See also DANA)

EM-DAT: International Disaster Database

EOC: Emergency Operations Center

ESF: Emergency Support Function

ETESA: Empresa de Transmisión Eléctrica/ Electric Transmission Company

EWEA: Early Warning Early Action

EWS: Early Warning System

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

FAP: Fondo de Ahorro de Panamá/Panama Savings Fund

F**ONDE**: Fondo Interamericano de Ayuda
de Emergencia/ Inter-American Emergency
Aid Fund

FTC: Fuerza de Tarea Conjunta de Seguridad y Turismo/ Joint Task Force for Security and Tourism

GDP: Gross Domestic Product

GFDRR: Global Facility for Disaster Risk Reduction (of the World Bank)

GIS: Geographic Information System

GOP: Government of Panama

HAZMAT: Hazardous Materials

HFA: Hyogo Framework of Action

HIAS: Hebrew Immigrant Aid Society

HN: Hospital de Niños/ Children's Hospital

HST: Hospital Santo Tomás/ Santo Tomás Hospital

IAP: Incident Action Plan

ICAP: Instituto Centroamericano de Administración Pública/ Central American Institute of Public Administration

ICGES: Instituto Conmemorativo Gorgas de Estudios de la Salud/ Gorgas Memorial Institute for Health Studies

ICRC: International Committee of the Red Cross

ICS: Incident Command System

IDAAN: Instituto de Acueductos y Alcantarillados Nacionales/ National Institute of Aqueducts and Sewers

IDB: Inter-American Development Bank

IDIAP: Instituto de Investigación Agropecuario/ Agricultural Research Institute

IFRC: International Federation of Red Cross and Red Crescent

IGC: Instituto de Geociencias de la Universidad de Panamá/ Institute of Geosciences of the University of Panama

IGNTG: Instituto Geográfico Nacional Tommy Guardia/ Tommy Guardia Institute of Geosciences

iGOPP: Índice de Gobernabilidad y Políticas Públicas/ Governance and Public Policy Index in Disaster Risk Management

IMA: Instituto de Mercadeo Agropecuario/ Agricultural Marketing Institute

IMELCF: Instituto de Medicina Legal y Ciencias Forenses/ Institute of Legal Medicine and Forensic Sciences

INEC: Instituto Nacional de Estadística y Censos/ National Institute of Statistics and Census

INGO: International Nongovernmental Organization

IOM: International Organization for Migration

IPA: Integrated Participatory Assessment

IPC: Integrated Food Security Phase Classification

IPHE: Instituto Panameño de Habilitación Especial/ Panamanian Institute for Special Education

ISA: Instituto de Seguro Agropecuario/ Agricultural Insurance Institute

IWGIA: International Work Group for Indigenous Affairs

JICA: Japan International Cooperation Agency

JTIA: Junta Técnica de Ingeniería y Arquitectura/ Engineering and Architecture Technical Board

K-12: Kindergarten through 12th grade

LNB: Lotería Nacional de Beneficencia/ National Lottery of Charity

LNO: Liaison Officer

LPRA: Liga Panameña de Radioaficionados/ Panamanian League of Radio Amateurs

MACOE: Manual del Centro de Operaciones de Emergencia/ Emergency Operations Center Manual

MDG: Ministry, Department, or Agency

M&E: Monitoring and Evaluation

MecReg: Mecanismo Regional de Asistencia Mutua en Desastres del Sistema de Integración Centroamericana/ Regional Mutual Disaster Assistance Mechanism of the Central American Integration System

MEDIVAC: Medical Evacuation

MEDUCA: Ministerio de Educación/ Ministry of Education

MEF: Ministerio de Economía y Finanzas/ Ministry of Economy and Finance

MIAMBIENTE: Ministerio de Ambiente/ Ministry of the Environment

MIDA: Ministerio de Desarrollo Agropecuario/ Ministry of Agricultural Development

MIDES: Ministerio de Desarrollo Social/ Ministry of Social Development

MINGOB: Ministerio de Gobierno/ Ministry of Government

MINREX: Ministerio de Relaciones Exteriores/ Ministry of Foreign Affairs

MINSA: Ministerio de Salud/ Ministry of Health

MITRADEL: Ministerio de Trabajo y Desarrollo Laboral/ Ministry of Labor and Labor Development

MIVIOT: Ministerio de Vivienda y Ordenamiento Territorial/ Ministry of Housing and Territorial Planning

MOP: Ministerio de Obras Públicas/ Ministry of Public Works

MOU: Memorandum of Understanding

MINSEG: Ministerio de Seguridad Pública/ Ministry of Public Security

ICT: Information and Communications Technology

NDMO: National Disaster Management Office

NDRMP: National Disaster Risk Management Plan

NERP: National Emergency Response Plan

NGO: Nongovernmental Organization (See also INGO)

NRC: Norwegian Refugee Council

OAS: Organization of American States

OCHA: Office of Coordination for Humanitarian Assistance (See also UNOCHA)

ODK: Open Data Kit

OECD: Organization for Economic Co-operation and Development

OFDA: Office of U.S. Foreign Disaster Assistance

OHCHR: Office of the United Nations High Commissioner for Human Rights

ONGSAR: Organización No Gubernamental para la Salvación de la Resiliencia Ambiental/ Non-Governmental Organization for Salvation of Environment Resilience

OPS: Organización Panamericana de la Salud (See also PAHO)

OSOP: Observatorio Sísmico Occidental de Panamá/ Western Earthquake Observatory

OXFAM: Oxford Committee for Famine Relief

PAB: Panamanian Balboa (See also “B/.”)

PAHO: Pan American Health Organization (See also OPS)

PCGIRD: Política Centro-Americana para la Gestión Integral del Riesgo de Desastres/ Central American Policy for Comprehensive Disaster Risk Management

POR: Planes Operativos de Respuesta/Operational Response Plan (of SISED MINSA)

POT: Planes de Ordenación Territorial Urbana/ Urban Territorial Organization Plans

PPP: Public-Private-Partnership

PRC-CA: Plan Regional de Preparación, Respuesta y Cooperación contra Derrames de Hidrocarburos y Sustancias Nocivas y Potencialmente Peligrosas para América Central/ Regional Preparedness Plan, Response and Cooperation against Spills of Hydrocarbons and Harmful Substances for Central America

PSS: Psychosocial Support

RCSP: Red Cross Society of Panama (See also CRP)

RDAP: Regional Disaster Assistance Program (of USAID)

REDHUM: Red de Información Humanitaria para América Latina y el Caribe/ Humanitarian Information Network for Latin America and the Caribbean

REDLAC: Grupo Regional de Riesgo, Emergencia y Desastre de América Latina y el Caribe/ Regional Group on Risks,

Emergencies and Disasters for Latin America and the Caribbean

RET: Refugee Education Trust

RIT: Regional Intervention Team (of CRP)

ROLAC: Regional Office for Latin America and the Caribbean (of UNOCHA)

RSN: Red Sismológica Nacional/ National Seismological Network

SAR: Search and Rescue (Also S&R)

SCD: Agencia Suiza para el Desarrollo y la Cooperación/ Swiss Agency for Development and Cooperation

SDG: Sustainable Development Goal

SELA: Sistema Económico Latino-Americano y del Caribe/ Latin American and Caribbean Economic System

SENACYT: Secretaría Nacional de Ciencia, Tecnología e Innovación/National Secretariat for Science, Technology, and Innovation

SENADIS: Secretaria Nacional de Discapacidad/ National Secretary for Disability

SENAFRONT: Servicio Nacional de Fronteras/ National Border Service

SENAN: Servicio Nacional Aeronaval/ National Air-Naval Service

SENNIAF: Secretaría Nacional de Niñez, Adolescencia y Familia/National Secretariat for Children, Adolescents, and the Family

SICA: Sistemade la Integración Centroamericana/ Central American Integration System

SINAPROC: Sistema Nacional de Protección Civil/ National Civil Protection System

SINIP: National Public Investment System/ Sistema Nacional de Inversión Pública

SINMA:Sistema Inteligente Nacional de Monitoreo de Alertas/ National Intelligent Alert Monitoring System

SISED:Sistema Institucional de Salud para Emergencias y Desastres/ Institutional System of Health Emergencies and Disasters

SITEAL: Sistema de Información de Tendencias Educativas en América Latina/ Information System on Educational Trends in Latin America

SM: Social media

SME: Small and Medium Enterprise

SOP: Standard Operating Procedures

SOUTHCOM: Southern Command (See also USSOUTHCOM)

SPC: Segregated Portfolio Company

SPI: Servicio de Protección Institucional/ Institutional Protection Service

SPIA: Sociedad Panameña de Ingenieros y Arquitectos/ Panamanian Society of Engineers and Architects

SUME 911: Sistema Unificado

para Manejo de Emergencias/ Unified Emergency Management System 911

TE: Tribunal Electoral de Panamá/ Panama Electoral Court

UDELAS: Universidad Especializada de las Américas/ Specialized University of the Americas

ULATINA: Universidad Latina de Panamá/ Latina University of Panama

UMIP: Universidad Maritima Internacional de Panamá/ Panamian International Maritime University

UNAIDS: United Nations Programme on HIV and AIDS

UNDP: United Nations Development Programme

UNDRR: United Nations Office for Disaster Risk Reduction

UNEP: United Nations Environment Programme

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNFCCC: United Nations Framework Convention on Climate Change

UNFPA: United Nations Population Fund

UNHCR: United Nations High Commissioner for Refugees

UNHRD: United Nations Humanitarian Response Depot

UNICEF: United Nations Children's Fund

UNOCHA: United Nations Office of Coordination for Humanitarian Assistance (See also OCHA)

UNOPS: United Nations Office for Project Services

UP: Universidad de Panamá/ Panama University

USAID-OFDA: United States Agency for International Development Office of U.S. Foreign Disaster Assistance
USD:United States Dollar

USSOUTHCOM: United States Southern Command (See also SOUTHCOM)

UTP: Universidad Tecnológica de Panamá (Technological University of Panama)

UTPMP: Un Techo para mi País/ A Roof for My Country

WASH: Water, Sanitation, and Hygiene

WCO: World Customs Organization
WFP: World Food Programme

WHO: World Health Organization

Wi-Fi: Wireless Fidelity

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EXECUTIVE SUMMARY

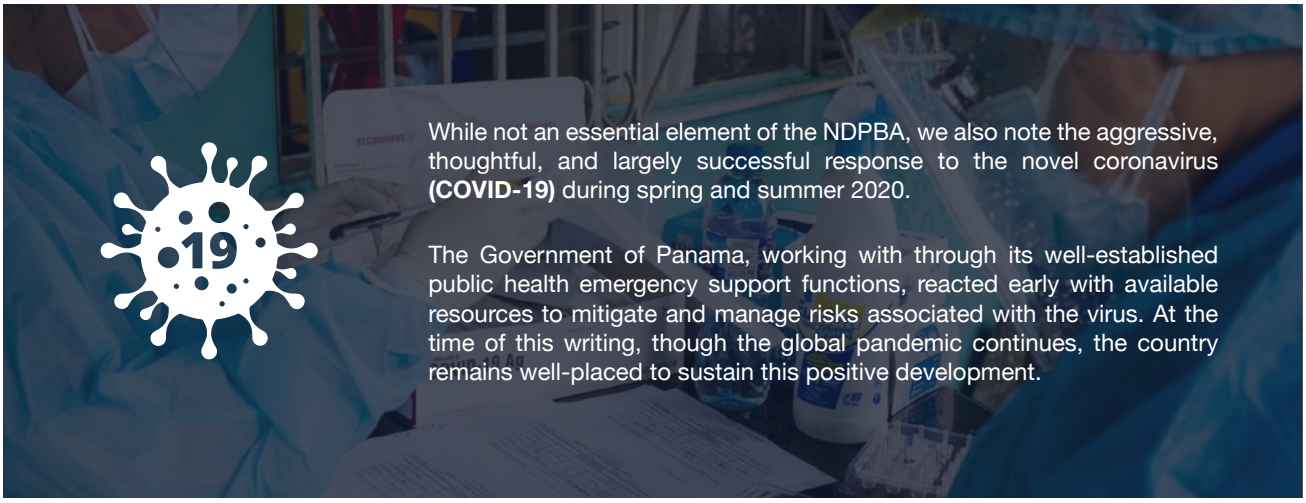
PANAMA NATIONAL DISASTER PREPAREDNESS BASELINE ASSESSMENT

OVERVIEW

The Pacific Disaster Center (PDC) completed the Panama National Disaster Preparedness Baseline Assessment (NDPBA) in partnership with Panama's Sistema Nacional de Protección Civil (SINAPROC). Hazard-based risks, 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 data made available by in-country partners during the period of the project from 2018-2021 and include recommendations that will increase disaster management readiness for supporting stakeholders. The NDPBA provides stakeholders with analytical tools, scientific data, and evidence-based practices that allow the disaster management community in Panama to reduce disaster risk and support response efforts. The methodology and associated recommendations are in alignment with United Nations Development Goals and the Sendai Framework for Disaster Risk Reduction 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 Panama. Although SINAPROC 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 Panama that supported the data gathering and vetting process. A complete list of PDC's valued partners in the NDPBA effort is included in this document.

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



While not an essential element of the NDPBA, we also note the aggressive, thoughtful, and largely successful response to the novel coronavirus **(COVID-19)** during spring and summer 2020.

The Government of Panama, working with through its well-established public health emergency support functions, reacted early with available resources to mitigate and manage risks associated with the virus. At the time of this writing, though the global pandemic continues, the country remains well-placed to sustain this positive development.

SUMMARY OF FINDINGS

Panama is influenced by major regional actors in Disaster Management (DM) due to several world and regional DM organizations' headquarters and logistical hubs being located in country. This has benefited Panama in advancing its DM capabilities and allowed the DM community to prepare the foundation for reducing disaster risk and increasing capabilities. Although progress has been made, there is much work to be done.

Panama is a small nation, 60th in the world, with an area of 78,200 square kilometers. It has coasts on both the Caribbean Sea and the Pacific Ocean; its land borders are with Colombia to the east and Costa Rica to the west. The country's narrow shape and location has strategic value, making it much cheaper for ships to cross from Atlantic to Pacific Ocean rather than longer routes around the Americas or to the east. A ship going from New York to San Francisco saves about 8,000 miles and five months of travel. The Panama Canal was officially opened in 1914; the U.S. retained control of the Canal and surrounding land until 1999 when it was transferred to the country of Panama.

Both Panama's landscape profile and geographic location are conducive to many types of natural hazards exist. For this assessment, we identified flood, earthquake, landslide, storm surge, tsunami, wildfire, and sea-level rise as the hazards that Panama's population is most exposed to.

NATURAL HAZARD EXPOSURE

260,000
people affected by natural disasters (1990 - 2019)

28,000
people affected by flooding in 2021


Flood


wildfire


Earthquake


Landslide


Storm Surge


Tsunami


Sea-level Rise


Expected to grow 9.9% in 2021 and converge to a potential rate of approximately 5% in the following years.


The COVID-19 pandemic struck Panama at a time of strong economic recovery. Consequently, GDP is expected to decline in the near term, slowing economic development and poverty reduction.

Exposure to multiple hazards is compounded by socioeconomic vulnerabilities in Panama. The country saw an average growth of 4.7 percent from 2014-2019 until COVID-19 Crisis, while the rest of Latin America and Caribbean grew 0.9 percent. However, while the poverty rate stood at 12.1 percent in 2019, rural areas experienced six times higher poverty rates than urban areas. According to the World Bank, Panama suffered one of the most severe impacts from the pandemic, reducing the medium labor income by eighteen percent in 2020, and while estimation of poverty was at 18.8 percent, efforts from Panama Solidario helped keep the poverty rate at 14.9 percent. The country's GDP contracted 17.9 percent in 2020.

The combination of multi-hazard exposure and vulnerability put Panama at increased risk of disasters from natural hazards. The International Disaster Database (EM-DAT) recorded fifty disaster events between 1990 and 2021 for Panama that affected approximately 260,000 people. Most disasters in Panama have been floods, with thirty-two floods taking place since 1990. Additionally, six storms, four earthquakes, four epidemics, three droughts, and one wildfire also took place since 1990. Many of the floods' associated secondary disasters are landslides that cause further damage to the environment and surrounding areas. Due to Panama's extended coastline, sea level rise is a concern with a population exposure of approximately one million people and $31 billion (USD) in capital.

RECENT MAJOR DISASTERS

2020
Hurricane Eta

2021
Bocas Del Toro Province floods

28,000 People affected

In the face of these challenges, we found that the Government of Panama has taken many steps to provide for the safety of its citizens.

Unlike other countries where it typically takes a major disaster to trigger public reform processes, Panama's impetus for DM reform has occurred through engagement with regional and international actors such as the Inter-American Development Bank (IDB), United Nations Office for Disaster Risk Reduction (UNDRR), the World Bank, and SICA-CEPREDENAC.[11]

Panama is an active partner of the Center for the Prevention of National Disasters in Central America (Centro de Coordinación para la Prevención de los Desastres Naturales en América Central, CEPREDENAC), through which regional frameworks guide both giving and receiving of regional support for disaster response. Attached to the Ministry of Government, the Regional Humanitarian Assistance Logistics Center (Centro Logístico Regional de Asistencia Humanitaria, CLRAH) is a major force in Panama and the region for preparedness and response.

Law 7[2] regulates DM activities in Panama and Executive Decree No.177 of 2008[13] defines the main institutional arrangements provided for in Law 7. Disaster declarations, response activation, and aid coordination are performed according to Law 7 which follows the protocols dictated by the regional instruments such as the Regional Mutual Disaster Assistance Mechanism of the Central American Integration System (MecReg-SICA).[14]

There is an acknowledged issue of high staff turnover that has created problems with knowledge retention. The recent addition (2021) to Law 7 of 2005, (Reorganizing the National Civil Protection System), Bill 541 & 494 (That Creates the Career of Civil Protection), is expected to professionalize civil protection careers, thereby strengthening Panama's disaster preparedness capacity.

NERP 2008, PNGR 2011-2015, National Framework for Recovery 2014, and several other national-level plans taken together govern all phases. However they are all due for renewal.[6,12,18]

Panama's national and subnational emergency services are not equipped with material nor human resources appropriate to manage known hazards due to serious and chronic lack of funding. Nevertheless, warehousing capacity is strong and disaster equipment inventories are kept up to date but are not maintained in a national database.

There is no single dedicated organization responsible for hazard monitoring in Panama. Hazard monitoring is primarily coordinated and conducted by SINAPROC as well as ETESA, ACP, Western Earthquake Observatory (Observatorio Sísmico Occidental de Panamá, OSOP), National Seismological Network (Red Sismológica Nacional, RSN), the Maritime Authority of Panama (Autoridad Maritima De Panama, AMP) and the University of Panama Geo-Science Institute (Instituto de Geociencias de la Universidad de Panamá, IGC).

While a great deal of work has been accomplished, and much progress has been made, many additional actions can be taken by the Government of Panama and its partners to further build capacity for disaster resilience and response.

RECOMMENDATIONS

These recommendations are included in greater detail in the body of the report. Our hope is that the Government of Panama and key development and disaster management partners will leverage the results of this comprehensive assessment to enable a more robust and sustainable disaster risk-reduction effort in Panama that will contribute to saving lives and property.

IN LIGHT OF OUR FINDINGS, PDC MAKES THE FOLLOWING RECOMMENDATIONS:

1. **Establish a comprehensive framework** to address Comprehensive Disaster Management (CDM).

2. **Strengthen the legal framework.**

3. **Develop formal budget arrangements** specifically for disaster management.

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

5 **Formally develop, integrate, and regularly update** plans and SOPs.

6 **Integrate NGO/private sector actors** into key DRM/DRR activities at the national and subnational levels.

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

8 **Formalize incident coordination and emergency operations.**

9 **Expand the national training and exercise program** with SINAPROC as lead agency.

10 **Advance professionalization of the DRM field.**

11 **Institutionalize** multi-hazard mapping and risk and vulnerability assessments.

12 **Strengthen** multi-hazard monitoring and early warning capabilities.

13 **Promote** data collection, management, and sharing.

14 **Identify causal effect of migration** to reduce population pressures.

15 **Create programs** to increase economic capacity.

16 **Create public health program t**o increase health care capacity and reduce strain on medical systems.

17 **Create programs to increase participation** in civil society and provide more opportunities for women and girls.

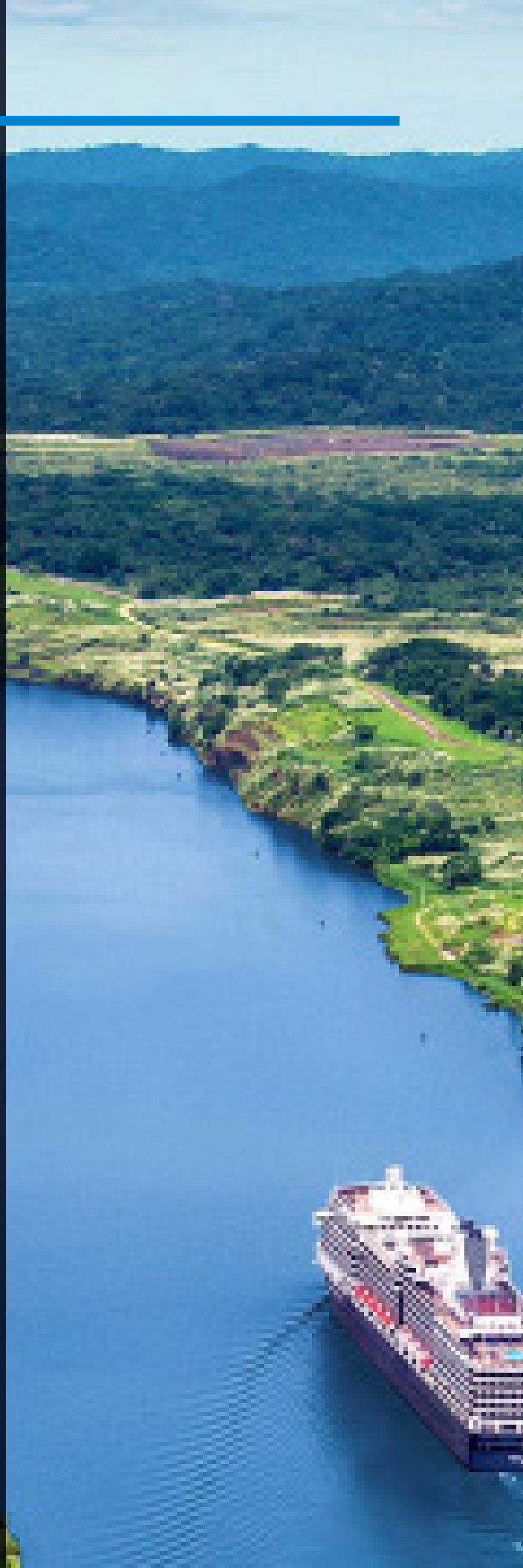
18 **Reassess progress** made toward DRM/DRR goals by updating the NDPBA.

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 Panama 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. Findings of this analysis were compiled into a Disaster Risk Reduction **(DRR)** Plan offering practical actions to be taken over a five-year period.

To access all findings, recommendations, and data (tabular and spatial), developed for this analysis, please visit the Pacific Disaster Center's DisasterAWARE platform at emops.pdc.org.



PANAMA 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 Panama.
- 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, Panama 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.

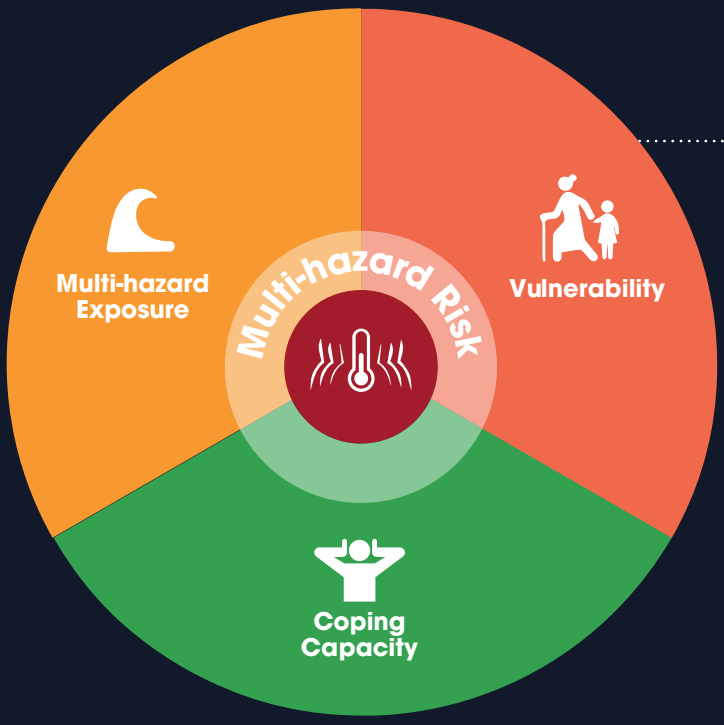
NDPBA

METHODOLOGY AND OBJECTIVES

OVERVIEW

MEASURING RISK

RVA METHODOLOGY | 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/national-baseline-assesssment.

OBJECTIVES

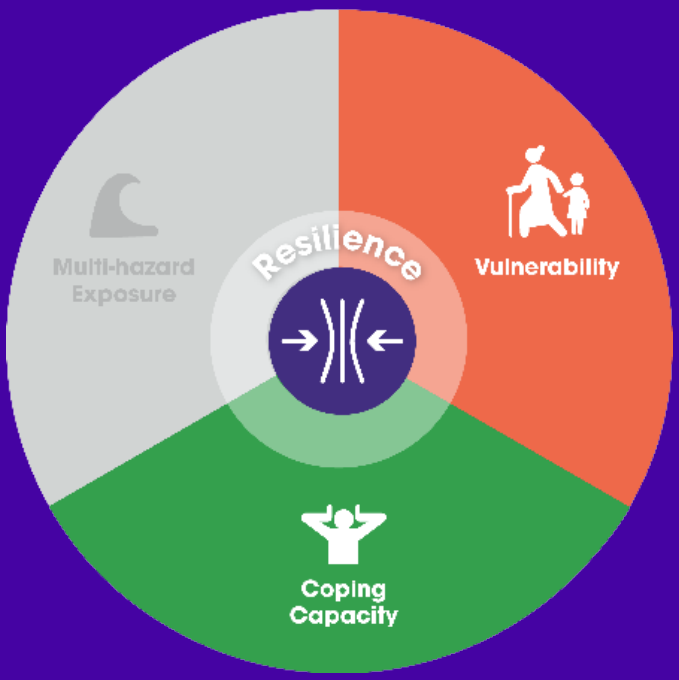
Form a foundation for long-term data sharing and monitoring to support disaster risk reduction.

Enhance decision making through improved access to temporal and spatial data.

MEASURING RESILIENCE

RVA METHODOLOGY

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.

KEY CONCEPTS
RVA METHODOLOGY

EXAMPLES AND DEFINITIONS

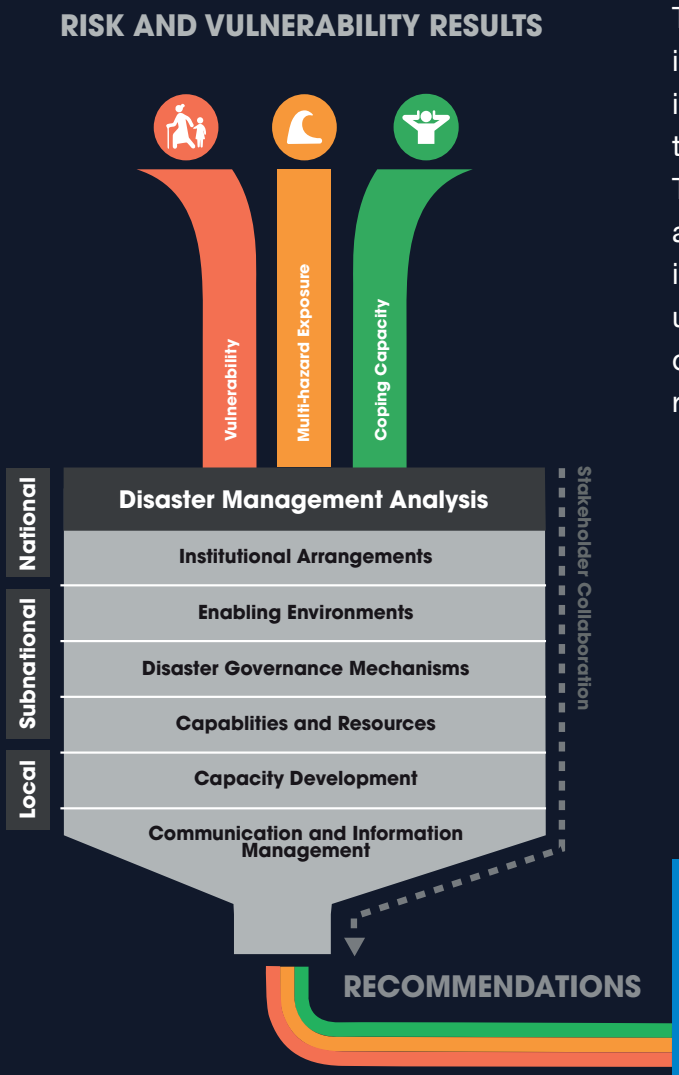
VULNERABILITY: Provides visibility into the underlying socioeconomic and societal factors that predispose areas to disasters. A vulnerability analysis measures the physical, environmental, social, and economic conditions and processes that increase susceptibility of communities and systems to the damaging 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 district. 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 district to withstand shocks and disruptions to normal function. For instance, districts 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.

DISASTER MANAGEMENT ANALYSIS

DMA METHODOLOGY



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.

ANALYSIS OBJECTIVES

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

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 BACKGROUND AND OVERVIEW

GEOGRAPHY

GEOGRAPHY

Panama is in Central America, the southernmost country before South America. It shares borders with Colombia to the east, Costa Rica to the west, the Caribbean Sea to the north and Pacific Ocean to the south. Panama's total land area is 78,200 square kilometers, with 2,490 km of coastline. The capital, Panama City, is located on the Pacific Ocean side, at the entrance of the Panama Canal. The Panama Canal connects the Caribbean Sea and the Pacific Ocean through an 82 kilometer waterway.

78,200 km²

Total Area ~30,193 mi²

687 KM / 2490 KM

Land Boundaries (total) / Coastline

10

Provinces

Neighboring Countries

- Colombia
- Costa Rica

225 km

Colombia

330 km

Costa Rica

3

Indigenous Comarcas

Oceans

- Atlantic (Caribbean Sea)
- Pacific

GEOLOGY AND CLIMATE

Panama has a tropical climate with high temperatures and high relative humidity throughout the year. Temperatures in Panama range from 24 to 30°C. Since temperature varies very little throughout the country, climate regions are determined by rainfall, with a variation between 1300mm to 3000mm per year depending on the region. Most rainfall occurs during the rainy season that goes from April to December, and most of the rain falls on the Caribbean side of the country. Panama's land features are predominantly mountains and hills that divide the continent, called Cordillera Central; they extend from the Costa Rican border to the isthmus, where the Panama Canal is located. The highest point in the country is the Volcan Baru at 3,475 meters high. The Darian Gap forms a jungle between Colombia and Panama where most of the Colombian Guerrillas operate. This jungle also creates a break in the Pan-American Highway, which would otherwise stretch from Alaska to Patagonia.

Sea-level Rise
890,000
(22.7%)
People exposed

Wildfires
657,000
(16.8%)
People exposed

Earthquake
451,000
(12%)
People exposed

Landslide
167,000
(4.4%)
People exposed

Tsunami
120,000
(3.1%)
People exposed

Floods
87,000
(2.2%)
People exposed

Storm Surge
21,000
(0.5%)
People exposed

CLIMATE

Floods

Wildfires

Storm Surge

Landslide

Sea-Level Rise

DEMOGRAPHICS

4.38 Million

Total population

65% Mestizo

(Spanish mixed with Indigenous)

Ethnic groups

10% Native Languages

93% Spanish

Language

92

Global socioeconomic vulnerability ranking

1.65 %

Avg. annual population growth

15.7

Doctors per 10k people

78.2

Avg. life expectations

23.3

Nurses per 10k people

13.9

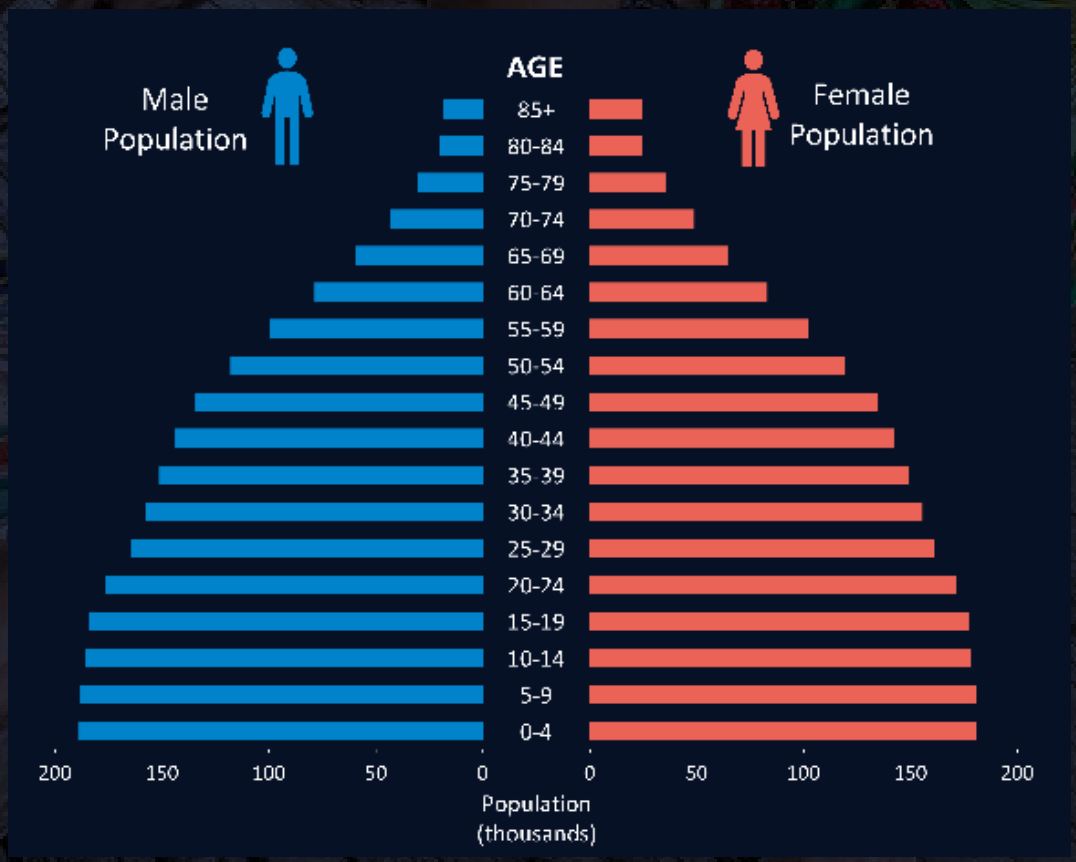
Infant deaths per 1k live births

23

Hospital beds per 10k people

94%

Adult literacy



ECONOMY

As of 2020, Panama's GDP was $52.9 billion (USD). Eighty percent of Panama's GDP is based on the services sector, with the industrial and agricultural sectors totaling 18 percent. Most of Panama's exports go to the United States, Netherlands, China, Costa Rica, India, and Vietnam. The country's top imports are fuels, machinery, vehicles, and pharmaceuticals. Although the poverty in Panama has fallen from 38.3 percent in 2006 to 14.9 percent in 2020, inequality continues to be an issue for the country with rural areas suffering six times more poverty rates than urban areas.

GDP and Key Exports

$ 52.9 Billion (USD) (-17.9%)
GDP (2020)

4.7 (Pre-Pandemic)
Avg. annual growth in GDP (2014-2019)

14.9%
People living below national Poverty line (2020)

Banana

Coffee

Shrimp

Passenger and Cargo Ships

Refined Petroleum

Copper Ore

Panama Canal

$270 billion (USD)
Value of Cargo Crossing the Canal per Year

6%
Of Global Trades

65 km
Length

6000 Miles/5 Months
Distance/Time saved by using Panama Canal

40%
Of Panama's GDP

KEY INFRASTRUCTURE

Transportation

50 Airports

1 Large

7 Medium

42 Small

41 Ports

8 Medium Size Harbor

6 Small Size Harbor

27 Very Small-Sized Harbor

96.38%

Access to improved water

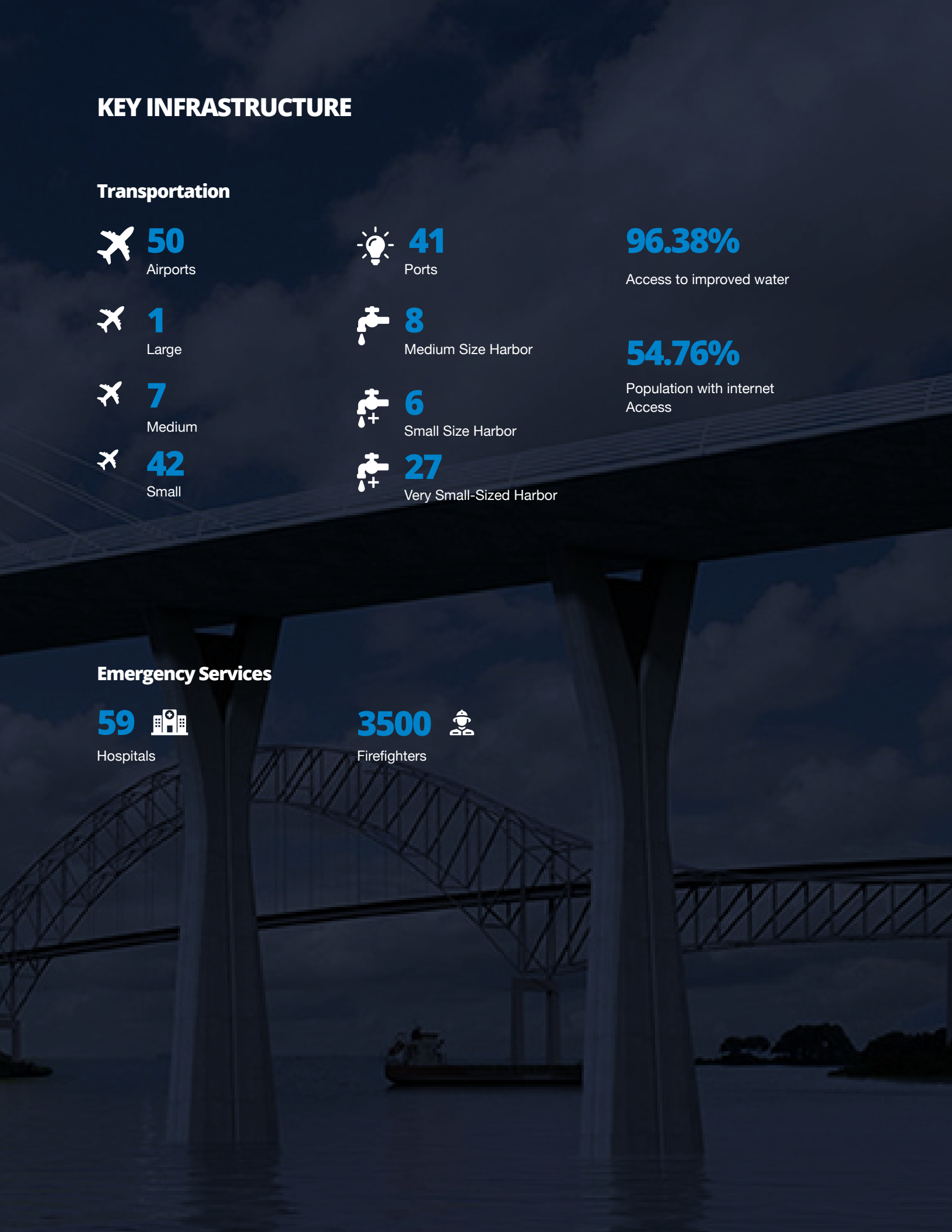
54.76%

Population with internet Access

Emergency Services

59 Hospitals

3500 Firefighters



DISASTER MANAGEMENT

Major Capacity improvements/milestones (past 16 years):

- Law 7 Reorganizing the National Civil Protection System 2005 established SINAPROC and forms the basis of emergency management regulation in Panama.

- The Regional Humanitarian Assistance Logistics Center (Centro Logístico Regional de Asistencia Humanitaria, CLRAH), attached to the Ministry of Government, was established in 2017. CLRAH positioned Panama as a regional humanitarian response hub and a major force in disaster preparedness and response.

- Panama joined the Caribbean Catastrophe Risk Insurance Facility (CCRIF) in 2019; this provides a robust regional risk transfer mechanism for mitigating residual disaster risk.

- Panama issued its National Climate Action Plan in 2021 which puts Panama in a stronger position to deal with the challenges brought by Climate Change and its negative effects and opens avenues for a more integrated approach to the existing SDGs, DRR, and CCA policies and plans.

- The recent addition (2021) to Law 7 of 2005, (Reorganizing the National Civil Protection System), Bill 541 & 494 (That Creates the Career of Civil Protection), is expected to professionalize civil protection careers, thereby strengthening Panama's disaster preparedness capacity.

- Additionally, major updates to disaster management and response planning efforts are currently underway that integrate stakeholders including Panama Red Cross, NGOs, CBOs, the private sector, and academia for better institutionalization of disaster governance.

Major Disaster Impacts (2010-2020)

- Bocas del Toro Heavy Rain and Floods (2021)
  Deaths 1 / Affected 27,189

- Panama, Colon and Darien Provinces Heavy Rain and Floods (2010)
  Deaths 13 / Affected 24,610

- Hurricane Otto (2016)
  Deaths 8 / Affected 12,000

- Hurricane Nate (2017)
  Deaths 7 / Affected 12,000

- Chiriqui, Darien, Coclé, Colon, Veraguas Provinces Heavy Rain and Floods (2010)
  Deaths 2 / Affected 6,296

THE RVA

RISK AND VULNERABILITY ASSESSMENT RESULTS

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 Panama National Disaster Preparedness Baseline Assessment. For details on the methodology and data sets used see Appendix A.

PANAMA PROVINCES

PANAMA BACKGROUND

Panama is a Central American country bounded by the Caribbean Sea to the east, the North Pacific Ocean to the west, - Colombia to the South and Costa Rica to the North. The Isthmus of Panama is a strategic location forming a land bridge connecting North and South America. Panama also controls the Panama Canal, a principal maritime shipping route that links the Atlantic to the Pacific Ocean. Panama is divided into ten provinces and three indigenous regions, forming the basis of the Risk Vulnerability data comparison.

COMPONENTS OF RISK

Vulnerability

Coping Capacity

Multi-Hazard Exposure

THE RVA

MULTI-HAZARD EXPOSURE

MULTI-HAZARD EXPOSURE

Panama's climate is primarily tropical maritime, with most land, mountains, or coastal plains intertwined with waterways. Two main seasons dominate the local environment – the rainy season spans the months of May to January, and the dry season from January to May.

The EM-DAT disaster database recorded 50 disaster events between 1990 and 2021 for Panama that affected approximately 260,000 people. Most disasters in Panama have been floods, with 32 floods taking place since 1990. Additionally, six storms, four earthquakes, four epidemics, three droughts, and one wildfire also took place since 1990. Many of the floods associated secondary disasters are landslides that cause further damage to the environment and surrounding areas.

Global Multi-Hazard Exposure Rank (from global RVA)

68 OUT OF 216 COUNTRIES

Panama's Multi-Hazard Exposure rank among other Central American countries

7 OUT OF 7 COUNTRIES

PANAMA HAZARD ZONES

Multi-hazard exposure in Panama was assessed at the provincial level by combining components of flood, earthquake, landslide, storm surge, tsunami, wildfire, and sea-level rise.

FLOOD

2.2%
Relative Population Exposure

86,825
Raw Population Exposure

$2.5 billion
Raw Economic Exposure (USD)

WILDFIRE

16.2%
Relative Population Exposure

634,021
Raw Population Exposure

$20.4 billion
Raw Economic Exposure (USD)

EARTHQUAKE

11.5%
Relative Population Exposure

451,406
Raw Population Exposure

$12.7 billion
Raw Economic Exposure (USD)

LANDSLIDE

4.3%
Relative Population Exposure

167,477
Raw Population Exposure

$6.7 billion
Raw Economic Exposure (USD)

STORM SURGE

0.5%
Relative Population Exposure

21,383
Raw Population Exposure

$210 billion
Raw Economic Exposure (USD)

TSUNAMI

3.1%
Relative Population Exposure

119,836
Raw Population Exposure

$7.6 billion
Raw Economic Exposure (USD)

SEA-LEVEL RISE

22.7%
Relative Population Exposure

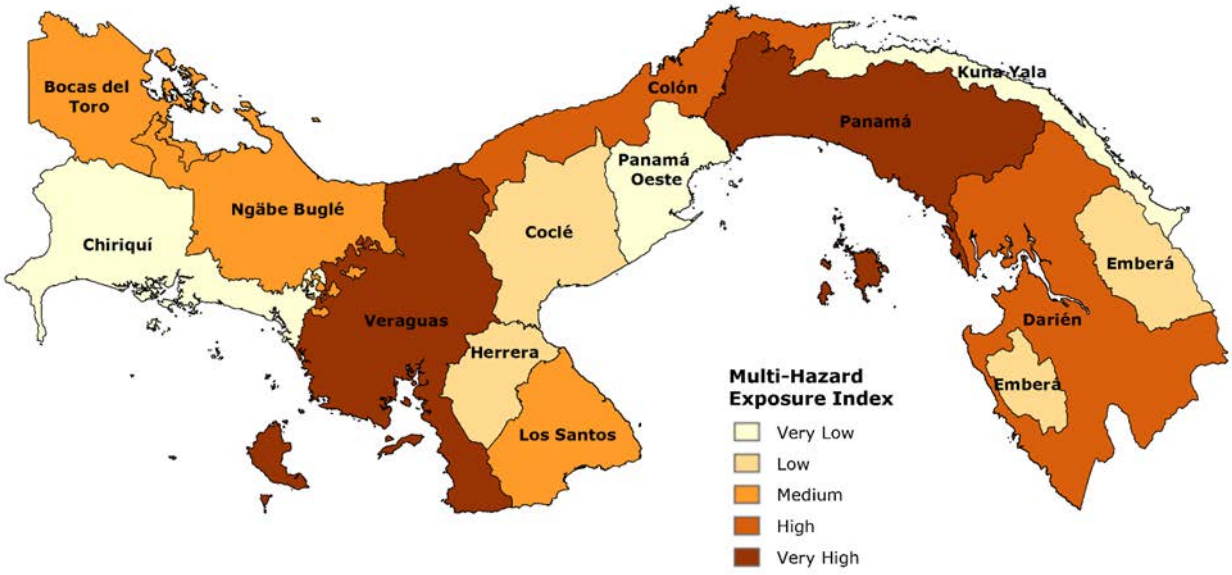
888,849
Raw Population Exposure

$31.6 billion
Raw Economic Exposure (USD)

MULTI-HAZARD EXPOSURE BY PROVINCE

RANK	PROVINCE	INDEX SCORE
1	Panamá	0.697
2	Veraguas	0.691
3	Colón	0.675
4	Darién	0.645
5	Los Santos	0.587
6	Bocas del Toro	0.586
7	Ngäbe Buglé	0.562
8	Emberá	0.513
9	Herrera	0.437
10	Coclé	0.435
11	Panamá Oeste	0.305
12	Chiriquí	0.303
13	Kuna Yala	0.11

VERY LOW | LOW | MEDIUM | HIGH | VERY HIGH


Bocas del Toro
Colón
Kuna Yala
Panamá
Panamá Oeste
Ngäbe Buglé
Coclé
Chiriquí
Emberá
Veraguas
Darién
Herrera
Emberá
Los Santos
Multi-Hazard Exposure Index
Very Low
Low
Medium
High
Very High

THE RVA

VULNERABILITY

VULNERABILITY

Vulnerability measures the physical, environmental, social, economic conditions, and processes that increase the 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 support the population adequately. In coordination with stakeholders, the following indicators were selected to measure vulnerability subcomponents in Panama. 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 (from global RVA)

94 OUT OF 204 COUNTRIES MESURED

Panama's Vulnerability Rank among other Central American countries

6 OUT OF 7 COUNTRIES

VULNERABILITY SUBCOMPONENTS AND INDICATORS

Population Pressures
Average Annual Population Change
Average Urban Population Change

Gender Inequality
Male to Female Economic Activity
Female to Male Secondary Enrollment Ratio
Proportion Female Seats in Local Government

Information Access Vulnerability
Average Years of Schooling
Illiteracy Rate
Internet Access
Television Access
Radio Accdss
School Enrollment Rate

Environmental Stress
Freshwater Withdrawal
Livestock Density
Percent Forest Cover Lost

Vulnerable Health Status
Life Expectancy
Infant Mortality Rate
Maternal Mortality Rate
Disability
Prevalence of Stunting
Infectious Disease (TB, Malaria, AIDS, and Dengue Incidence)

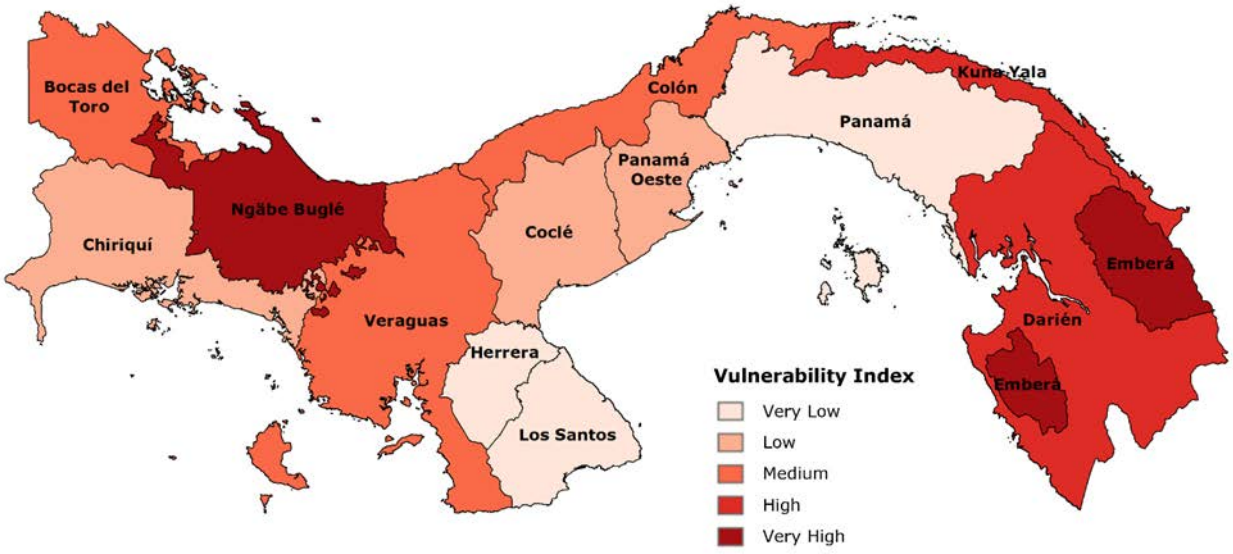
Clean Water Access Vulnerability
Households without Improved Water
Households with Improved Sanitation Access

Economic Constrains
Economic Dependency Ratio
Poverty

VULNERABILITY BY PROVINCE

RANK	PROVINCE	INDEX SCORE
1	Ngäbe Buglé	0.712
2	Emberá	0.605
3	Kuna Yala	0.597
4	Darién	0.537
5	Bocas del Toro	0.510
6	Veraguas	0.406
7	Colón	0.392
8	Panamá Oeste	0.391
9	Coclé	0.385
10	Chiriquí	0.365
11	Herrera	0.351
12	Los Santos	0.297
13	Panamá	0.266

VERY LOW | LOW | MEDIUM | HIGH | VERY HIGH


Bocas del Toro
Colón
Kuna Yala
Panamá
Panamá Oeste
Ngäbe Buglé
Chiriquí
Coclé
Emberá
Veraguas
Darién
Herrera
Emberá
Los Santos
Vulnerability Index
Very Low
Low
Medium
High
Very High

THE RVA

COPING CAPACITY

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 Panama. Breaking down each coping capacity subcomponent to the indicator level allows users to identify the critical drivers of coping capacity to support risk reduction efforts and policy decisions.

Global Coping Capacity Rank (from global RVA)

72 OUT OF 198 COUNTRIES MESURED

Panama's Coping Capacity Rank among other Central American countries

2 OUT OF 7 COUNTRIES

VULNERABILITY SUBCOMPONENTS AND INDICATORS

Economic Capacity
GDP per Capita
Median Monthly Salary
Municipal Income per Capita

Governance
Crime Syndicates
High Impact Crime Rate
Voter Participation
Public Garbage Collection

Environmental Capacity
Protected Area
Reforested Area

Communications Capacity
Households with Mobile Phones
Households with Fixed Phones

Transportation Capacity
Road Density
Port Distance

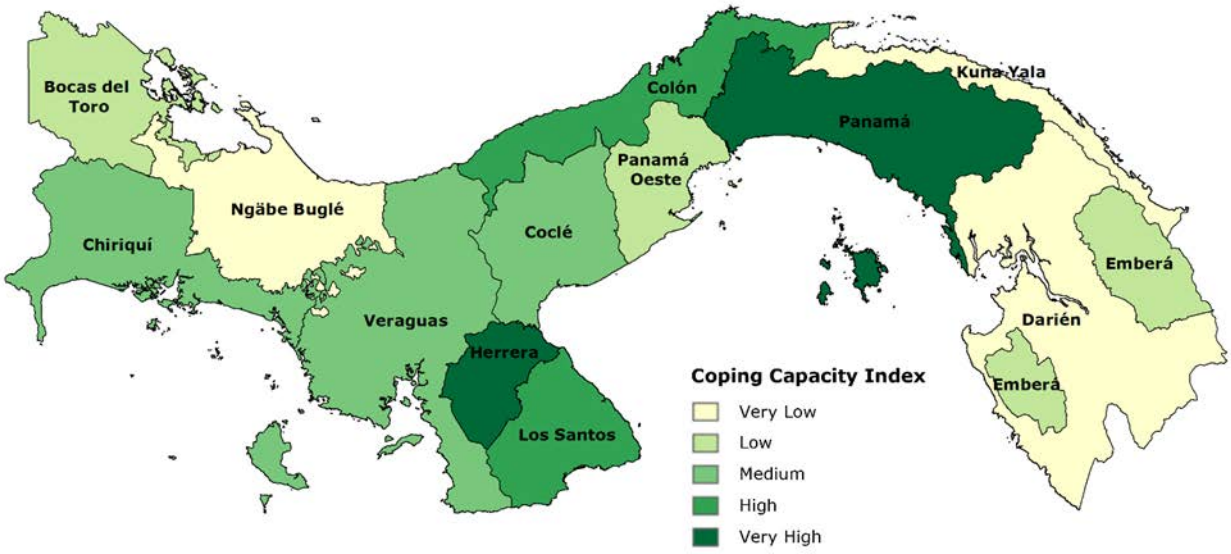
Health Care Capacity
Hospital Beds per 10,000 Persons
Physicians per 10,000 Persons
Nurses per 10,000 Persons
Distance to Hospital
Immunization Coverage

Energy Capacity
Households Connected to Public Electrical Grid

COPING CAPACITY BY PROVINCE

RANK	PROVINCE	INDEX SCORE
1	Herrera	0.638
2	Panamá	0.636
3	Los Santos	0.591
4	Colón	0.579
5	Veraguas	0.549
6	Coclé	0.518
7	Chiriquí	0.510
8	Panamá Oeste	0.467
9	Bocas del Toro	0.453
10	Emberá	0.352
11	Darién	0.342
12	Kuna Yala	0.333
13	Ngäbe Buglé	0.194

VERY LOW | LOW | MEDIUM | HIGH | VERY HIGH


Bocas del Toro
Colón
Kuna Yala
Panamá
Panamá Oeste
Ngäbe Buglé
Coclé
Chiriquí
Emberá
Veraguas
Darién
Herrera
Emberá
Los Santos
Coping Capacity Index
Very Low
Low
Medium
High
Very High

THE RVA

RESILIENCE

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.

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

Global Resilience Rank (from global RVA)

80 OUT OF 194 COUNTRIES MESURED

Panama's Resilience Rank among other Central American countries

2 OUT OF 7 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 and reduce losses resulting from disasters.
- Establish a provincial-level foundation for monitoring risk and vulnerability over time.
- Enhance decision making for disaster risk reduction initiatives.

RESILIENCE COMPONENTS

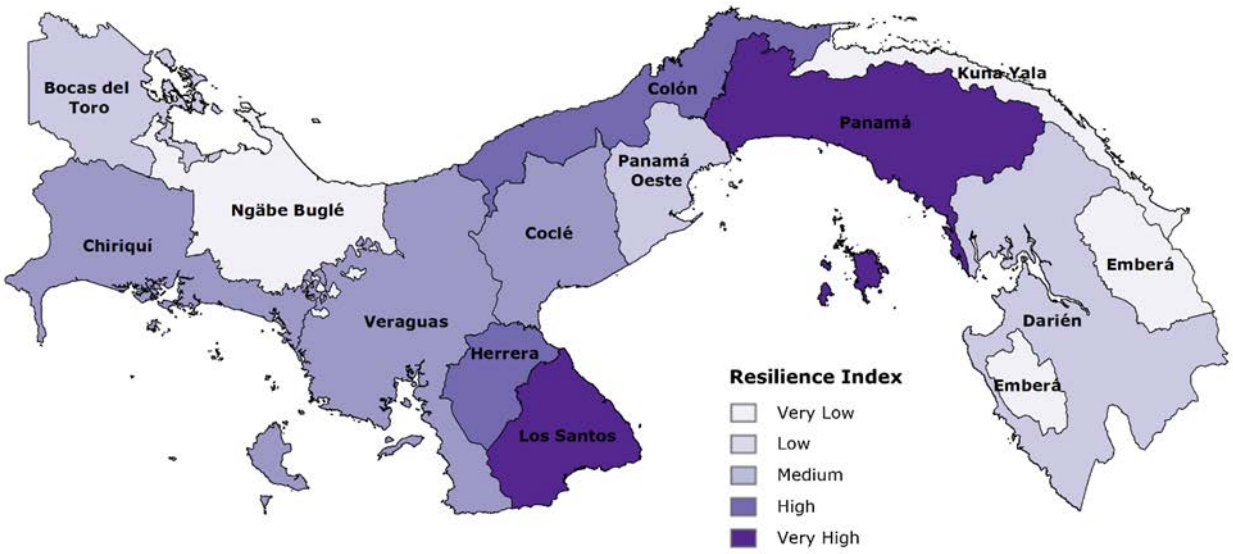
Vulnerability

Coping Capacity

RESILIENCE BY PROVINCE

RANK	PROVINCE	INDEX SCORE
1	Panamá	0.685
2	Los Santos	0.647
3	Herrera	0.644
4	Colón	0.593
5	Chiriquí	0.573
6	Veraguas	0.572
7	Coclé	0.566
8	Panamá Oeste	0.538
9	Bocas del Toro	0.471
10	Darién	0.402
11	Emberá	0.373
12	Kuna Yala	0.368
13	Ngäbe Buglé	0.241

VERY LOW | LOW | MEDIUM | HIGH | VERY HIGH


Bocas del Toro
Colón
Kuna Yala
Panamá
Panamá Oeste
Ngäbe Buglé
Chiriquí
Coclé
Emberá
Veraguas
Darién
Herrera
Emberá
Los Santos
Resilience Index
Very Low
Low
Medium
High
Very High

THE RVA

HAZARD-SPECIFIC RISK

HAZARD-SPECIFIC RISK

Hazard-Specific Risk examines individual hazard exposure combined with resilience at the provincial level to provide a clear understanding of risk drivers for each hazard type. Specific hazards assessed include flood, earthquake, landslide, storm surge, tsunami, wildfire, and sea-level rise. Hazard-Specific Risk provides a tool for disaster managers to anticipate, plan for, and mitigate outcomes of specific hazard events across Panama.

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 a department's population.
- Enhance national and subnational multi-hazard planning.
- Prioritize national and province-level hazard-specific mitigation actions.
- Provide necessary justification to enhance hazard monitoring and implement early warning systems.

HAZARD RISK COMPARED

Earthquake

Landslide

Flood

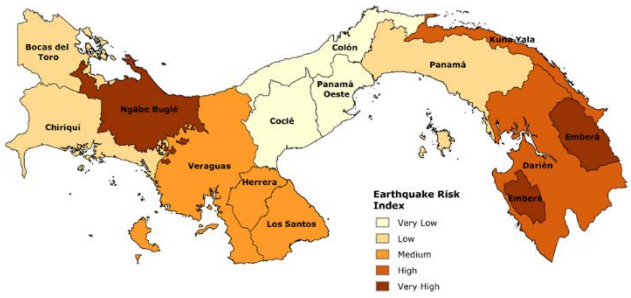
Storm Surge

Tsunami

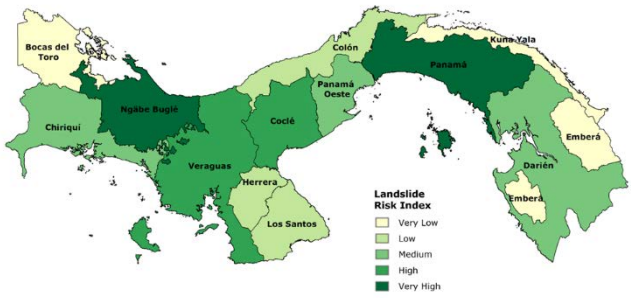
Wildfire

Sea-Level Rise

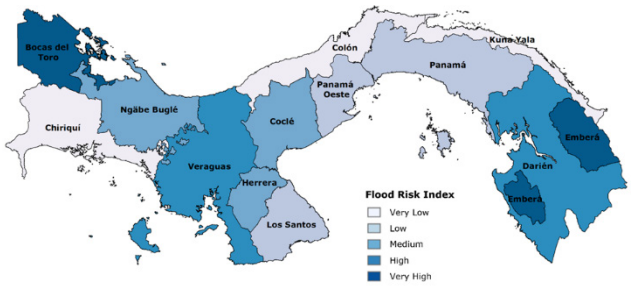
EARTHQUAKE RISK INDEX



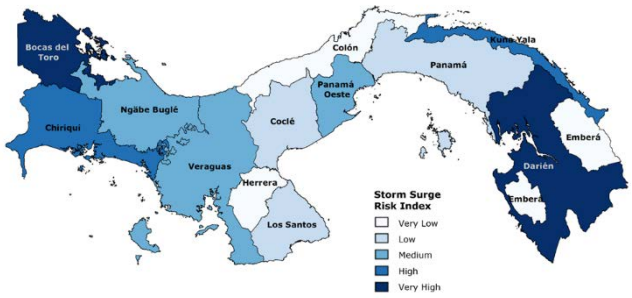
LANDSLIDE RISK INDEX



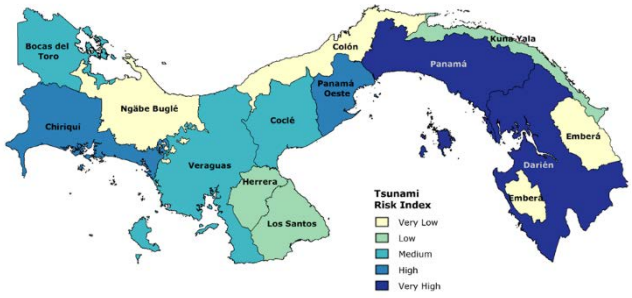
FLOOD RISK INDEX



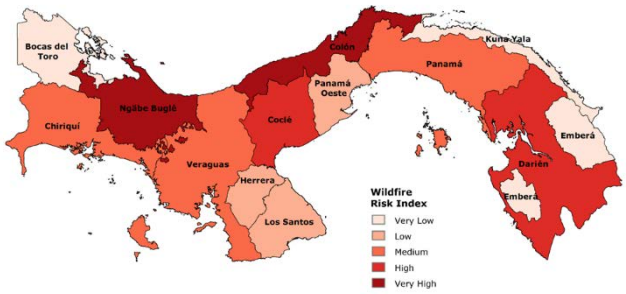
STORM SURGE RISK INDEX



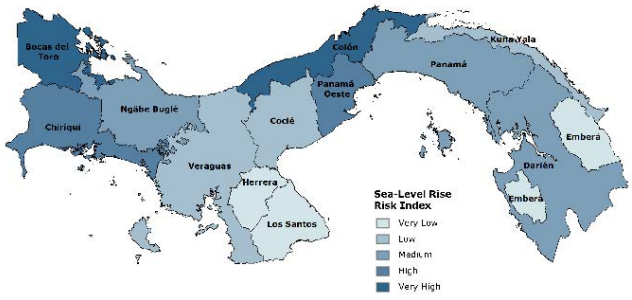
TSUNAMI RISK INDEX



WILDFIRE RISK INDEX



SEA-LEVEL RISE RISK INDEX



THE RVA

MULTI-HAZARD RISK

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 province 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.

Multi-hazard Risk in Panama was calculated by averaging Multi-hazard Exposure, Vulnerability, and Coping Capacity. Results are displayed across each province below, while additional detail on municipal Risk is provided in the individual province profiles.

Global Multi-hazard Rank (from global RVA)

96 OUT OF 193COUNTRIES MESURED

Panama's Multi-hazard Rank among other Central American countries

7 OUT OF 7 COUNTRIES

MULTI-HAZARD RISK COMPONENTS

Vulnerability

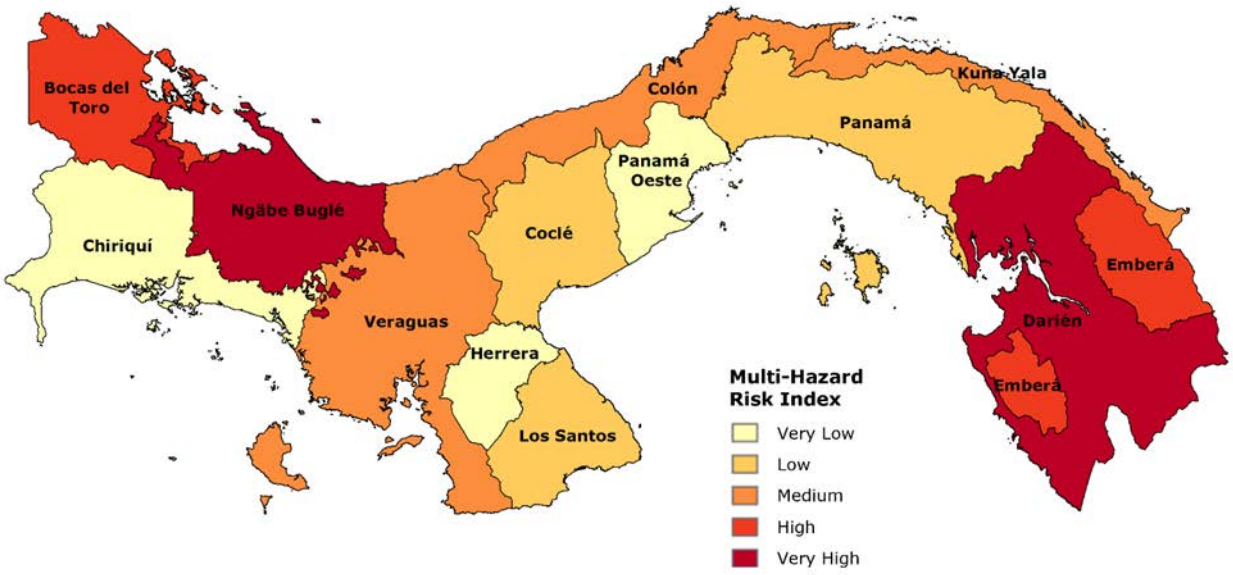
Coping Capacity

Multi-Hazard Exposure

MULTI-HAZARD RISK BY PROVINCE

RANK	PROVINCE	INDEX SCORE
1	Ngäbe Buglé	0.693
2	Darién	0.613
3	Emberá	0.589
4	Bocas del Toro	0.548
5	Veraguas	0.516
6	Colón	0.496
7	Kuna Yala	0.458
8	Panamá	0.442
9	Coclé	0.434
10	Los Santos	0.431
11	Panamá Oeste	0.410
12	Chiriquí	0.386
13	Herrera	0.383

VERY LOW | LOW | MEDIUM | HIGH | VERY HIGH


Bocas del Toro
Colón
Kuna Yala
Panamá
Panamá Oeste
Ngäbe Buglé
Chiriquí
Coclé
Emberá
Veraguas
Darién
Herrera
Emberá
Los Santos
Multi-Hazard Risk Index
Very Low
Low
Medium
High
Very High

THE DMA

DISASTER MANAGEMENT ANALYSIS

SUMMARY OF FINDINGS

DISASTER MANAGEMENT ANALYSIS

FINDINGS & RECOMMENDATIONS

Provided in this section are the results of the Disaster Management Analysis (DMA) that was conducted as part of the Panama 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 THEME AND SUBTHEMES

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 and Political Support
Attitudes and Experience

Capacity Development
Capcapacity 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

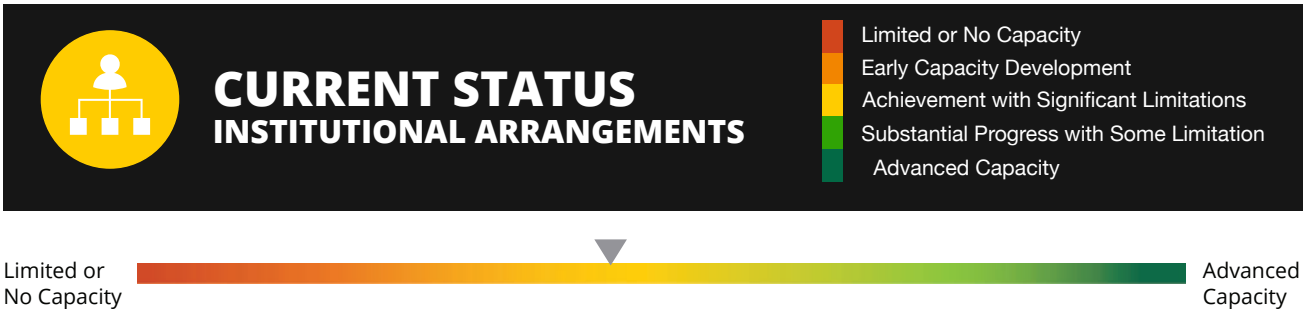
Communication and Information Management
Hazard and Risk Analysis Systems
Disaster Assessment
Media and Public Affairs
Information Collection, Management, and Distribution

THE DMA

INSTITUTIONAL ARRANGEMENTS

INSITUTIONAL ARRANGEMENTS

Panama's current institutional arrangements for Disaster Management (DM) have clear achievements with significant limitations.



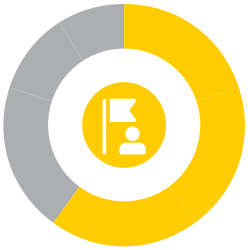
Panama is an active partner of the Center for the Prevention of National Disasters in Central America (Centro de Coordinación para la Prevención de los Desastres Naturales en América Central, CEPREDENAC), through which regional frameworks guide both giving and receiving of regional support for disaster response. Attached to the Ministry of Government, the Regional Humanitarian Assistance Logistics Center (Centro Logístico Regional de Asistencia Humanitaria, CLRAH) is a major force in Panama for preparedness and response. Sistema Nacional de Protección Civil (SINAPROC), Panama's National Disaster Management Agency, enjoys a good degree of latitude in performing Disaster Management (DM) functions that it delegates and shares across all levels of the government. However, there is an acknowledged issue of high staff turnover that creates problems with knowledge retention. The recent Law (541 & 494 combined)1 that creates the career of Civil Protection amending and adding articles to Law 7 Reorganizing the National Civil Protection System 2005, is expected to professionalize Civil Protection careers, thereby bolstering DM processes. SINAPROC oversees Panama's national Disaster Risk Reduction (DRR) platform, led by the National Commission of CEPREDENAC; the Climate Change platform (Comité Nacional de Cambio Climático de Panamá, CONACCP) is led by the Ministry of Environment (Ministerio de Ambiente, MIAMBENTE); and the National Committee for Monitoring Sustainable Development Goals (SDGs) is led by the Ministry of Social Development (Ministerio de Desarrollo Social, MIDES). While these platforms allow Panama to make meaningful progress towards reducing future disaster losses, there is still work that remains to be done to address social and territorial gaps and environmental problems that persist throughout the country; plan adoption and inclusive action are recommended as means to close the gaps. The private sector plays an active role in building logistics capacity through CLRAH, the United Nations (UN) and the Panama Red Cross (Red Cross Society of Panama RCSP or Cruz Roja Panamá, CRP). However, gaps remain in participatory action engagement especially from academia, Community Based Organizations (CBOs), and Non-Governmental Organizations (NGOs).

SUBTHEME STATUS
INSTITUTIONAL ARRANGEMENTS

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

Organizational Structures

- Organization of government disaster management functions
- Organization of governmental disaster management offices
- Regionalized disaster management capacity
- Engagement with bilateral, international, and other humanitarian actors
- National platform/office to manage disaster risk reduction and Sendai Framework implementation
- National platform/office to manage climate change adaptation/action
- National platform/office to manage sustainable development 2030 agenda
- Integration of disaster risk reduction, climate change adaptation, and sustainable development
- Integration of military into civil disaster management structure



Leadership Arrangements

- Linkage of disaster management leadership to political leadership
- Disaster management leadership arrangements
- Percentage of leadership positions filled
- Requirements for job-specific competencies for disaster management 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

Mechanisms for Stakeholder Engagement

- Nongovernmental stakeholders represented in governmental disaster management structures
- Public-Private Partnerships (PPPs)

- Inventory of NGO and private sector disaster management capabilities
- Nature of multi-stakeholder engagement
- Private sector engagement
- Organizational arrangements used by NGOs to support disaster management efforts
- Academia involvement in government disaster management
- Relationship between national governments, regional entities, and global disaster management organizations

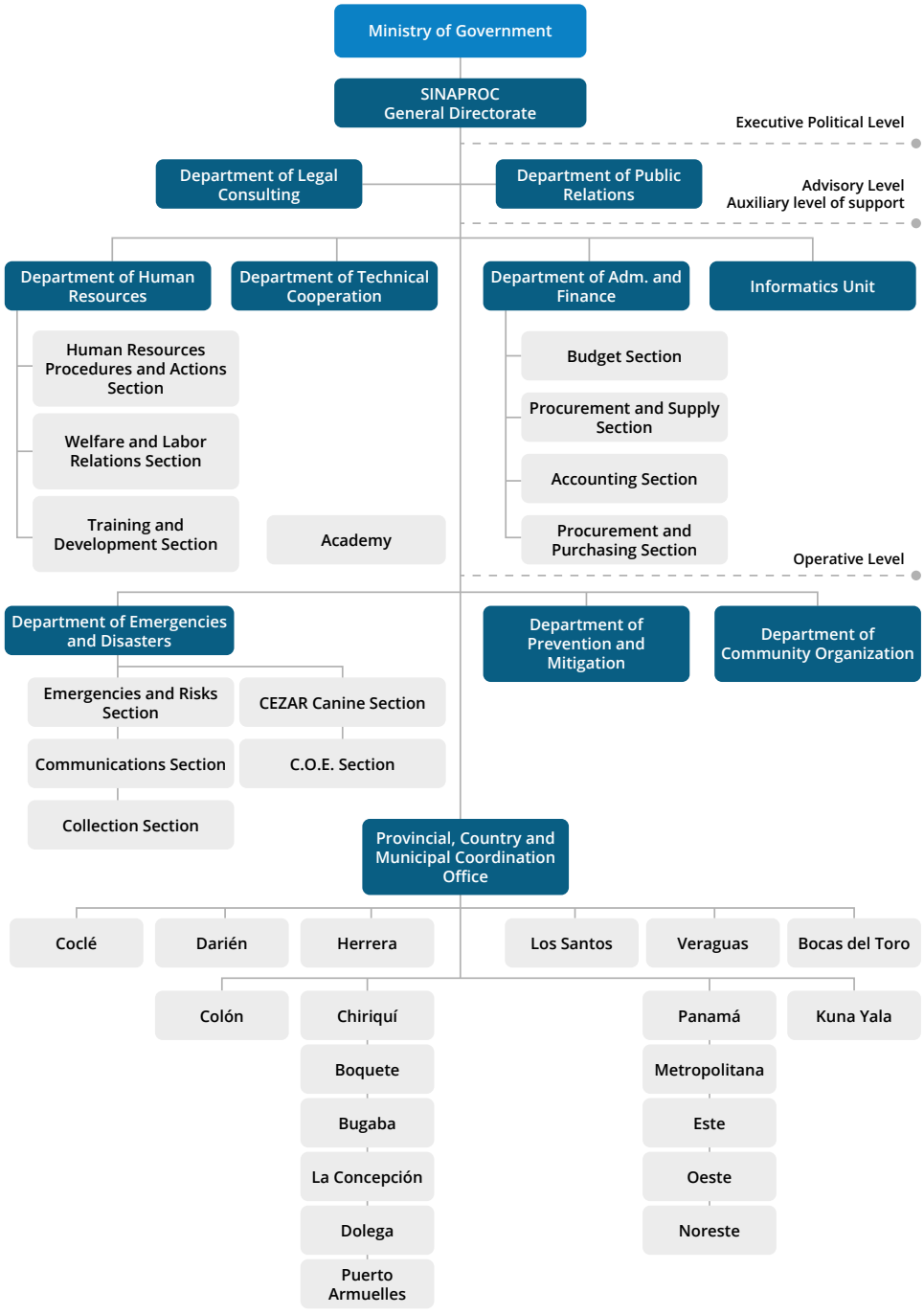


Figure 3 - Panama Emergency Operations Center (Source: MINGOB, 2019)

INSITUTIONAL ARRANGEMENTS

FINDINGS AND RECOMMENDATIONS TO ACHIEVE ADVANCED CAPACITY

DMA RECOMMENDATIONS: ORGANIZATIONAL STRUCTURES

FINDINGS

The Government is in the process of updating major policies and plans delineating the roles within DRR and disaster response organizations. These need to be aligned with the Central American Policy on Disaster Risk Reduction (Política Centroamericana para la Gestión Integral del Riesgo de Desastres, PCGIR)3/Sendai Framework and integrated across policies and SDG priorities. The existing platform on DRR (through the National Commission of CEPREDENAC led by SINAPROC), the Climate Change platform, CONACCP led by MIAMBENTE, and the National Committee for Monitoring Sustainable Development Goals led by MIDES are already functioning well, but there is a need for more policy integration across the national and subnational levels. MIAMBIENTE issued a National Climate Action Plan in 20214 which has several provisions that need to be translated into action. Therefore, we recommend the following:

1. Ensure a unified implementation of the DRR provisions under the Sendai Framework and Climate Change Adaptation (CCA), across all projects with the local governments; and integration of SDGs to DRR and CCA provisions.

2. Continue the regular dialogue between CONACCP, SINAPROC and the NGOs, private sector, academia, and others to advance the planned actions around climate issues.

3 Address the challenges related to social and territorial gaps and environmental problems in SDGs.

4 Require more comprehensive interventions with special emphasis on economic, social, environmental, institutional, and democratic governance areas where there are persistent structural problems.

5 Address the systemic, and the new issues brought on by the COVID-19 pandemic, on vulnerable populations.

DMA RECOMMENDATIONS: ORGANIZATIONAL STRUCTURES

FINDINGS

Institutional arrangements are already defined in the National Emergency Operations Center (COE) Manual with key stakeholder participation and roles. However, the COE Manual (Manual del Centro de Operaciones de Emergencia, MACOE)5 and the NERP6 are in the process of being/need to be updated and must provide a stronger emphasis on stakeholder integration. Panama's Vision 2030 National Strategic Plan7 emphasizes strategic partnerships for development as well as institutionalization and governance. These priority areas can be leveraged upon in further institutionalizing disaster management within the country.

6 Ensure that interagency DM responsibilities are clearly mapped for effective disaster risk management (DRM) implementation within SINAPROC and across all agencies beyond response activities to include preparedness and DRR.

7 Strengthen policies to ensure NGOs, private sector partners, and other sectoral organizations are comprehensively engaged in government disaster management efforts in a coordinated and complementary manner. Formally integrate them into plans. Formalize and build relationships with key partners in these sectors.

8 Leverage the existing technical committees targeted at sectors for hazard specific policy- making such as the Institutional System of Health Emergencies and Disasters (Sistema Institucional de Salud para Emergencias y Desastres, SISED) of the Ministry of Health (Ministerio de Salud, MINSA).

9 Fully engage higher education institutions in technical committees through memoranda of understanding (MOUs) and proper funding mechanisms. Tie these to the science and technology (S&T) agenda.

10 Expand the activities of NGOs and private sector partners and formalize them to operate at the subnational level to address specific needs of populations.

11 Create a formal NGO Association whose program/ mission areas have DM.

12 Leverage the NGOs under the leadership or through the guidance of the Panamanian Red Cross and SINAPROC for local capacity building.

13 Include academia in DM by linking DM research and training needs to academic programs.

14 Build on the existing links between SINAPROC and Ministry of Education (MEDUCA) and the University of Panama.

15 Develop and establish formal agreements between SINAPROC's Academy of Civil Protection and the leading universities such as the Technological University of Panama (Universidad Tecnológica de Panamá, UTP) and Panama University (Universidad de Panamá, UP).

16 Include disaster risk analysis and climate change in the national S&T agenda (as recommended by the Inter-American Development Bank (IADB) in 2015).

DMA RECOMMENDATIONS: LEADERSHIP ARRANGEMENTS

FINDINGS

Disaster Law 7 of 20052 was amended through Law 541 & 494 of February 2021 to professionalize the civil protection career. There appears to be a high staff turnover due to the 5-year political election cycle. The amendment to Law 7 is expected to mitigate staff turnover, bring specialization, knowledge retention, and lead to efficiencies and effectiveness in SINAPROC. Therefore, we recommend the following:

17 Mitigate high staff turnover and establish competencies through the provisions of Law 541 & 494 to ensure an established civil security career pathway

18 Abandon the practice of political/discretionary appointments.

19 Require relevant bachelor's and/or master's degrees for key leadership positions by associating those to relevant academic offerings and with proper funding mechanisms.

20 Address the short-term staffing needs in key critical DM functional areas.

21 Institute and expand training programs and exercise requirements and link to competencies in key leadership positions and for all relevant DM staff including the media.

22 Establish proxy leaderships attached to the nature of the disaster.

DMA RECOMMENDATIONS: LEADERSHIP ARRANGEMENTS

FINDINGS

The joint task force (Fuerza de Tarea Conjunta de Seguridad y Turismo, FTC) with the National Police, the National Air-Naval Service (Servicio Nacional Aeronaval, SENAN) and the National Border Service (Servicio Nacional de Fronteras, SENAFRONT), together with SINAPROC is already established and well-coordinated. The Regional Humanitarian Assistance Logistics Center (CLRAH) attached to the Ministry of Government (Ministerio de Gobierno MINGOB) gives Panama a major boost in preparedness and response. The logistics capacity assessment of Panama recently performed together by CLRAH and private sector partners is a major step forward.[9] The existing capacity needs should be enhanced by the findings of that assessment. We recommend:

23 Ensure a harmonized and resource effective working relationship between SINAPROC and Ministry of Public Security (Ministerio de Seguridad Pública, MINSEG) through clear delineation of roles in the ongoing planning updates that are based on the Central American Comprehensive Disaster Management (CDM) Framework (PCGIR).[3]

24 Build and maintain standing committees for DRM decision making beyond the Joint Task Force (FTC) to instill active stakeholder participation to engender a broader perspective on needs and capabilities.

DMA RECOMMENDATIONS: MECHANISMS FOR STAKEHOLDER ENGAGEMENT

FINDINGS

As a major hub for business due to its tax incentives and the Panama Canal, Panama has potential to leverage private sector resources in DRR, prevention, preparedness, and response beyond its current capacity. In other words, businesses can be an organic partner in disaster risk reduction in Panama and can be empowered to reduce the burden on the government. A private sector registry for disaster management efforts does not exist. An active database is needed where they can officially collaborate with SINAPROC beyond ETESA and other existing Public Private Partnerships (PPPs). CLRAH has already started assessing the logistics and private sector capability to acertain how they can be expanded.[10]

25 Create a centralized inventory of the NGO and private-sector DM stakeholder communities with DM program areas/missions in coordination with the Prevention department and EOC Liaison Officers (LNOs).

26 Maintain and establish a private sector resource and logistics capability database leveraging on the existing database created through CLRAH.

27

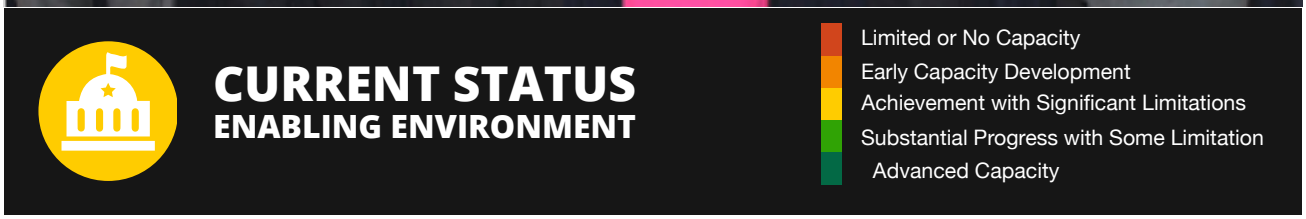
Expand policies to include PPP and strengthen partnerships across the government and private sector to include but not limited to:

- The Panama Canal Authority (Autoridad del Canal de Panamá ACP)
- ETESA
- MoviStar
- Civil Aeronautics Authority (Autoridad de Aeronáutica Civil, AAC)
- Panamanian Chamber of Construction (Cámara Panameña de la Construcción, CAPAC)
- Panamanian Society of Engineers and Architects (Sociedad Panameña de Ingenieros y Arquitectos, SPIA)
- National Chamber of Freight Transportation (Cámara Nacional de Transporte de Carga, CANATRACA)
- National Council of Private Enterprise (CONEP)
- Logistics Business Council of Panama (Consejo Empresarial Logístico COEL)
- Mortgage Bank of Panama
- Agricultural Marketing Institute (Instituto de Mercadeo Agropecuario, IMA)

THE DMA

ENABLING ENVIRONMENT

ENABLING ENVIRONMENT



Panama's enabling environment for DM has clear achievements with significant limitations.

Unlike other countries where it typically takes a major disaster to trigger public reform processes, Panama's impetus for DM reform has occurred through engagement with regional and international actors such as the Inter-American Development Bank (IDB), United Nations Office for Disaster Risk Reduction (UNDRR), the World Bank, and SICA-CEPREDENAC.[11] The National Comprehensive Disaster Risk Management Plan 2010 (PNGIRD),[12] which draws on Central American Policy on Disaster Risk Reduction (PCGIR)[3] is a comprehensive disaster risk management policy framework with a proactive and corrective disaster risk management approach that delegates responsibilities across public and civil society organizations.[11] Law 72 regulates DM activities in Panama; Executive Decree No.177 of 200813 defines the main institutional arrangements provided for in Law 7. Disaster declarations, response activation, and aid coordination are performed according to Law 7 which follows the protocols dictated by the regional instruments such as the Regional Mutual Disaster Assistance Mechanism of the Central American Integration System (MecReg-SICA).[14] Municipalities are required to develop their own DRR and DM plans which are guided by the Manual of Functions and Competencies of Municipal Disaster Managers (Manual de Funciones y Competencias de los Gestores Municipales de Desastres) in 2017.[15] However, plans need updating and budgets are not properly established to perform the mandates fully. The Strategic Framework for the Financial Management of Disaster Risk (Marco Estratégico de Gestión Financiera de Riesgos de Desastres),[16]

adopted through Executive Decree 578 of 2014, authorizes the Ministry of Finance (Ministerio de Economía y Finanzas, MEF) to provision funds. However, legal instruments establishing disaster budgets, risk transfer, and disaster loans for the public and their guidelines for use are in developing stages. While there is a strong private sector capability and varying degrees of support from NGOS, CBOs, and citizen groups, a more active involvement of these groups is necessary.

SUBTHEME STATUS
ENABLING ENVIRONMENT

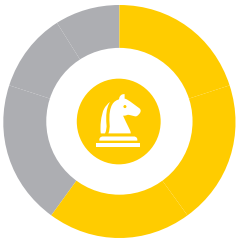
- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Legal Instruments

- Legal arrangements for disaster management requirements
- Legal foundation for the establishment of disaster management institutions
- Completeness of legislation to support all phases of disaster management
- National basis for disaster management legislative process
- Implementation schedule for legislation
- Legal establishment of disaster management budgets
- 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 authority of military in support of disaster management activities
- Level of socialization of disaster management legislation throughout government
- Legal requirements for disaster management structures at subnational levels of government
- Legislative guidance and support to disaster risk reduction activities and requirements
- Legal foundation of international and cross-border disaster management engagement to include participation in regional and international disaster management frameworks

Financial Resources

- Budget arrangements for disaster management
- Compliance with disaster management funding and legislation targets
- Scope of the disaster management budget
- 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
- Existing disaster reserve fund restrictions
- Current level of disaster management budget support
- Role of grant programs to support preparedness and disaster risk reduction programs at all subnational and local levels of government
- 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, businesses, or NGO recovery
- Government support for disaster microfinance
- Guidelines for the provision of disaster relief funds to impacted jurisdictions.



Strategies

- Integration of mitigation planning into disaster risk reduction policy instruments
- 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
- Inclusion of gender and vulnerable groups in disaster management and disaster risk reduction strategies and policies

Public Confidence and Political Support

- Legal arrangements for disaster management requirements
- Legal foundation for the establishment of disaster management institutions
- Completeness of legislation to support all phases of disaster management
- National basis for disaster management legislative process
- Implementation schedule for legislation
- Legal establishment of disaster management budgets
- Formalized legislative process, cooperation mechanisms, and means to acquire human and material resources during disasters.
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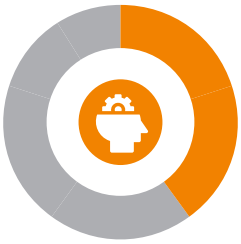
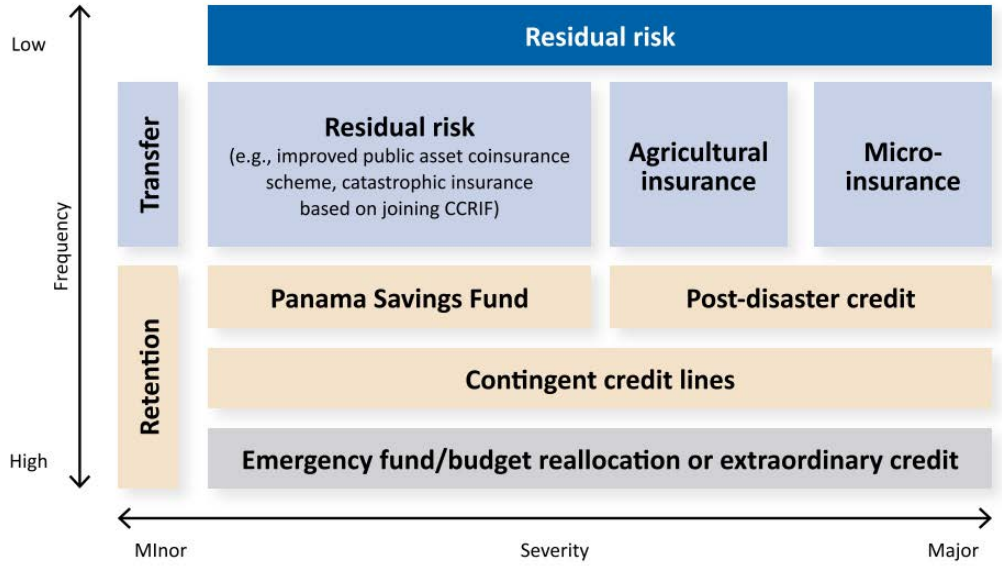


Attitudes and Experience

- 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



Note: The instruments currently in effect include the coinsurance scheme for public assets, agricultural insurance (managed by the Agricultural Insurance Institute [ISA]), and the FAP, as well as post-disaster credit, contingency lines of credit, and budgetary reallocation or extraordinary credit. The instruments still to be evaluated are the improved coinsurance scheme for public assets and catastrophic insurance, which could be obtained through participation in the CCRIF; micro-insurance (to be implemented by the Superintendency of Insurance and Reinsurance); and the emergency fund.

FINDINGS AND RECOMMENDATIONS TO ACHIEVE ADVANCED CAPACITY

DMA RECOMMENDATIONS: LEGAL INSTRUMENTS

FINDINGS

Panama has recently enacted a law to enhance the DM structure, clarify SINAPROC's role, and institutionalize the career of civil protection. However, beyond that Panama's legislative system is mainly based on executive decrees. There is a need to include implementation schedules in the laws so that the necessary structural arrangements and the steps to further strengthen the disaster management systems are not delayed. Further amendments may be needed per our recommendations below to add implementation schedules, budget provisions, proxy leadership arrangements, and specialized stakeholder-driven national committees for disaster management beyond response. Therefore, we recommend amending/creating the DM legislation to:

1. Address comprehensive disaster management (CDM) (All-hazards, all phases, and whole-of-society); base it on the Central American Policy for Comprehensive Risk Management (PCGIR) of CEPREDENAC.

2. Ratify the newly updated plans as stated above.

3 Address implementation schedules.

4 Establish dedicated disaster contingency funds.

5 Provision risk financing mechanisms.

6 Formalize declarations process, vertical cooperation mechanisms, and the articulation of requisitions for human and material resources during disasters.

7 Strengthen/empower subnational level DRM structures.

8 Strengthen code enforcement mechanisms at the local levels.

9 Address vulnerable groups and gender issues

10 Mandate hazard risk assessment and management in planning

11 Require the systemization, or updating of disaster risk databases incorporating frequency of occurrences associated with event intensity levels into hazard risk (as recommended by IADB in 2015). [8]

12 Require utility companies to conduct risk assessments (as recommended by IADB in 2015). [8]

13 Include disaster risk analysis and climate change (CC) in the national science & technology agenda (as recommended by IADB in 2015).[8]

14 Require continuous monitoring of at least two natural hazards in the country (as recommended by IADB in 2015). [8]

15 Require environmental industry, agriculture, health, education, transportation, (Water, Sanitation, and Hygiene, WASH), telecommunications, energy, and tourism sectors to conduct disaster risk analyses and CC effects within the scope of their respective competencies (as recommended by IADB in 2015).

DMA RECOMMENDATIONS: FINANCIAL RESOURCES

FINDINGS

Legal provisions exist for ordering the creation and maintenance of disaster risk management information systems; each sector to conduct disaster risk analysis within its sectoral competencies; a housing policy that provisions responsibility for disaster risk analysis within the scope of its competencies (per the findings of IADB in 2015).8 For the missing provisions, we recommend:

16 Mandate environmental industry, agriculture, health, education, transportation, WASH, telecommunications, energy, tourism, sectors to define the responsibility to conduct disaster risk analysis and CC effects within the scope of its competencies.

17 Require risk assessments for DM and DRR planning efforts with proper enforcement mechanisms.

18 Make disaster assessments a requirement under the declarations process.

19 Require the creation, systemization, or updating of disaster risk databases (as recommended by IADB in 2015).

20 Include disaster risk analysis and CC in the national science & technology agenda (as recommended by IADB in 2015).

21 Mandate the identifcation of zones where threats and risks are in cities to inform planning efforts (as recommended by IADB in 2015).

DMA RECOMMENDATIONS: FINANCIAL RESOURCES

FINDINGS

Panama's laws do not specifically provision disaster related funds. The Panama Savings Fund (Fondo de Ahorro de Panamá, FAP) is the contingency budget that the government can tap using specific provisions for withdrawal and approval through the Cabinet. The President has a discretionary fund which also can be used for major disasters. The Strategic Framework for Financial Management of Disaster Risk 201416 is a guiding policy to handle disaster-related funding. The framework suggests that for DRR projects to be technically viable, funds need to be allocated from the general budget. MEF and its subsidiary organization DICRE oversee disaster risk financing. MEF is working with the Inter-American Development Bank (IDB) and World Bank to create contingency lines of disaster funding. Therefore, we recommend:

22 Legally create a national and subnational DM budget(s) provisioning the following:

23 A standalone dedicated budget separate from ministry funds,

24 Adequate funding to improve Panama's DM/DRR operational capacity,

25 Tie to Law 7 through an amendment,

26 Pre-set target levels,

27 Programmatic, administrative, and operational needs addressed,

28 Training, education, and research and development (R&D) needs addressed,

29 Capacity development funds at national and subnational levels,

30 A contingency budget for immediate relief,

31 Guidelines for access and use,

32 Guidelines for provision of relief funds to disaster victims,

DMA RECOMMENDATIONS: FINANCIAL RESOURCES

FINDINGS

Panama joined Caribbean Catastrophe Risk Insurance Facility (CCRIF) in 2019.17 Panama is already working to assess risk transfer methods and has chosen a parametric insurance route through SICA. In the Caribbean, CRIF has been applying a similar mechanism for the last ten years. Panama leveraged CCRIF after Tropical Cyclone Eta in November 2020 with $2.7 million (USD) payout. Having a dedicated disaster fund may mean less funding from CCRIF. Paradoxically, having a dedicated disaster fund may result in smaller payouts from CCRIF. Decisions pertaining to insurance must be based on scientific hazard modeling. Catastrophic risk insurance is not affordable at the individual consumer level. There are loans and other mechanisms available, but they can be expanded. We recommend:

33 Strengthen catastrophic risk insurance market with proper regulatory mechanisms for affordable premiums and market solvency working with CCRIF and private insurance companies.

DMA RECOMMENDATIONS: STRATEGIES

FINDINGS

Currently, household recovery is managed by the government or certain banks. A more formalized way of accessing funding streams for housing recovery would be beneficial for DRR in the long term. We recommend:

34 Create affordable formal microfinancing mechanisms through PPPs. Leverage existing disaster financing programs such as the UN Emergency Relief Fund, CCRIF, Inter-American Emergency Aid Fund (Fondo Interamericano de Ayuda de Emergencia, FONDEM), and Caribbean Development Bank.

35 Establish low-interest loans available to support household, business, or NGO recovery costs that are ineligible under other funding streams or options.

DMA RECOMMENDATIONS: PUBLIC CONFIDENCE AND POLITICAL SUPPORT

FINDINGS

There is a need for more formal arrangements to include stakeholders, particularly the RCSP. We recommend:

36 Formally integrate NGOs, particularly the Panama Red Cross to the National Disaster Management System for a more harmonized working relationship with SINAPROC.

37 Address the needs, resource contribution capabilities, and participation of all stakeholder groups including NGOs and the private sector.

38 Align strategic plans and policies to integrate SD, DM and DRR for all phases through stakeholder support and input.

39 Strengthen the participation of stakeholders through creation of committees. operational needs addressed,

40 Through legal provisions, establish robust governance foundation for emergency preparedness related activities.

DMA RECOMMENDATIONS: PUBLIC CONFIDENCE AND POLITICAL SUPPORT

FINDINGS

Public engagement in DM efforts is not at the desired levels. There are programs like the Bosai and MEDUCA's teacher preparedness programs that can be leveraged. There is a family preparedness campaign that was inactive at the time of our assessment. We recommend:

40 Periodically collect political approval ratings/assess household preparedness levels in order to determine core DRR/DM needs and gaps within communities

41 Periodically conduct surveys to assess the DRM/DRR needs of vulnerable populations within each jurisdiction.

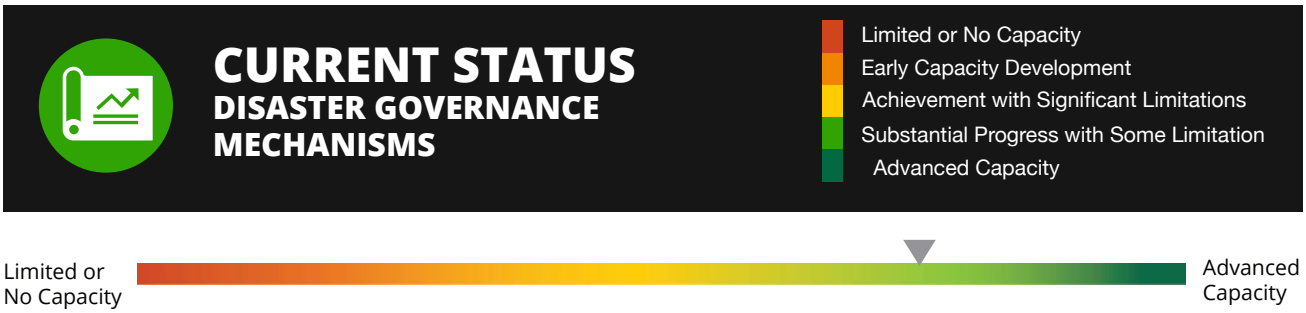
42 Reactivate the family preparedness campaign with proper resources and funding.

43 Enhance/instill public training/education programs for pre-disaster awareness.

THE DMA

DISASTER GOVERNANCE MECHANISMS

DISASTER GOVERNANCE MECHANISMS



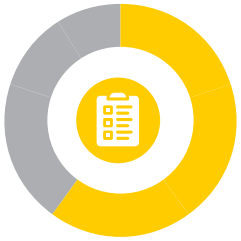
Panama's current disaster governance mechanisms have clear achievements with some limitations.

NERP 2008, PNGR 2011-2015, National Framework for Recovery 2014, and several other national-level plans govern all phases, however they are due for renewal.[6,12,18] Panama follows international standards in Incident Command and Coordination structure for large disaster management operations and maintains a state-of-the-art COE conveniently located within the CLRAH. Disaster declaration, incident alert levels, and protocols for activating, receiving, and providing external disaster assistance are governed according to the regional frameworks and legal mandates in place as mentioned throughout this report. For subnational response activation SINAPROC provides resources and guidance through the help from the Association of Municipalities of Panama (Asociación de Municipios de Panamá, AMUPA). Every major government authority and agencies have their incident command and coordination structures in place. There is a need to provide planning guidance to the sectoral business continuity, and Continuity of Operations Plans (COOP) to relevant public and private stakeholders.

Panama does not currently have a national-level Continuity of Government (COG) or COOP plan or strategy.

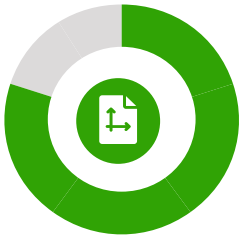
SUBTHEME STATUS
DISASTER GOVERNANCE MECHANISMS

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



Plans and Standard Operating Procedures

- Inclusion of all phases of disaster management in plans and procedures
- Establishment and clarity of plans and procedures to support long-term community recovery
- 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 standard operating procedures
- 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



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

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
- Mitigation and protection implemented for primary EOC from known hazards
- Accessibility of the national EOC to key government officials
- Existence of primary and secondary EOCs
- Policy and practice for minimum time to full EOC activation
- Duration of EOC operations with existing, staff, equipment, and resources
- Establishment of field-level coordination centers
- Communications interoperability that has been established and validated across all of government

Figure 3 - Panama Emergency Operations Center (Source: MINGOB, 2019)

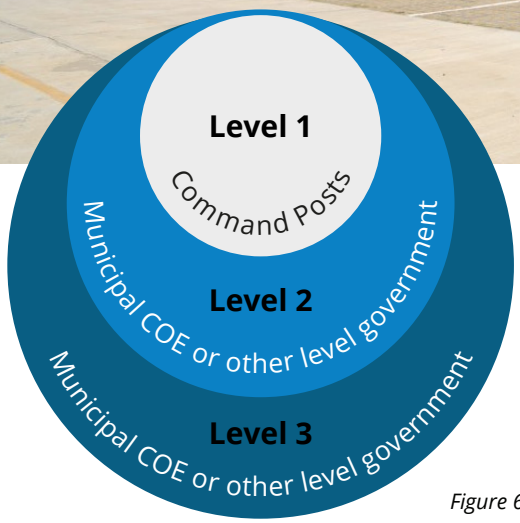


Figure 6 - COE Activation System (Source: MACOE, 2009, p.10)[5]

Figure 4 - SINAPROC National COE (Source: PDC, April 2019)

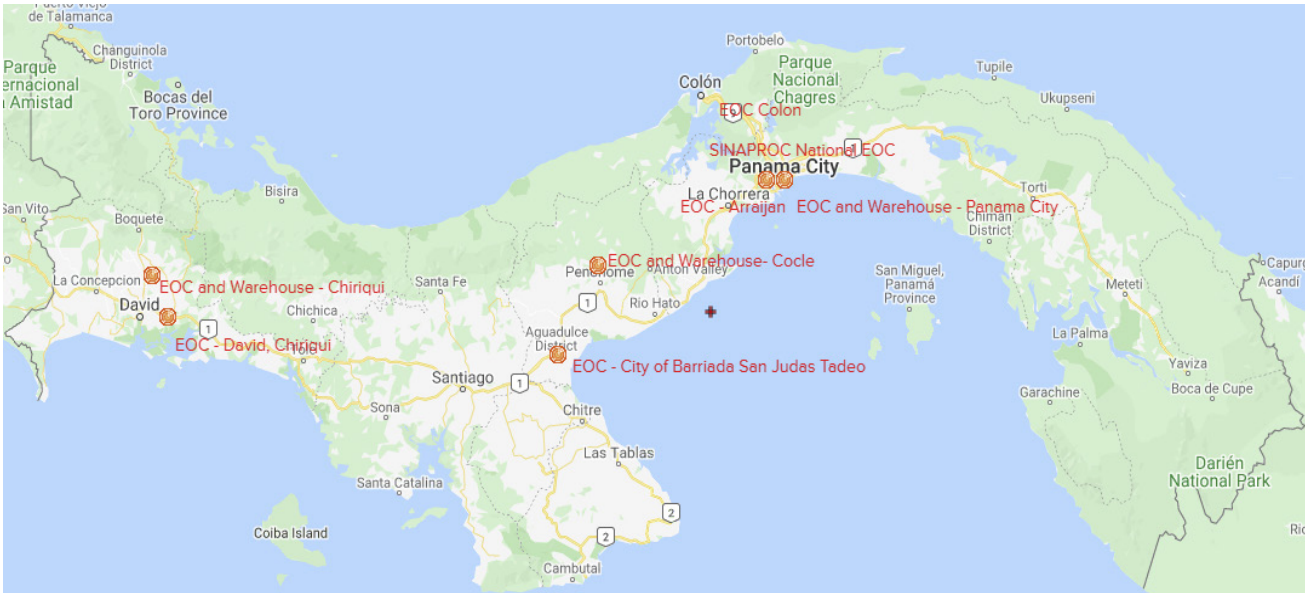


Figure 5 - Map of COEs in Panama (Source: EMOPS)

FINDINGS AND RECOMMENDATIONS TO ACHIEVE ADVANCED CAPACITY

DMA RECOMMENDATIONS: PLANS AND STANDARD OPERATING PROCEDURES

FINDINGS

National strategic plans need to be translated into legislation without delay. For example, National Disaster Risk Management Plan (PNGIRD) 2015-2021 was not ratified by the President. The new plan under development needs ratification to be operational. Panama does not have a national-level Continuity of Government (COG) or Continuity of Operations (COOP) plan or strategy. The volunteer policy is in the form of a pre-draft law going back to 2014.[19] SINAPROC's Volunteer Corps mission can be strengthened with a ratified policy that effectively sets the standards and roles in volunteering. Therefore, we recommend:

1. Periodically update the Standard Operating Plans and Procedures (SOP) and response frameworks to address current needs through the creation of standard evaluation procedures; align with DRM policies.

2. Update government plans to address short- and long-term disaster recovery needs including psychosocial recovery.

3 Develop and require the use of COOP and COG plans. Leverage the existing COOP strategy by Latin American and Caribbean Economic System (Sistema Económico Latinoamericano y del Caribe, SELA).[20]

4 Finalize the new versions of PNGIRD, NERP, National Recovery Framework, and the EOC Manual (Manual del Centro de Operaciones de Emergencia, MACOE) by tailoring them to Panama.

5 Prepare and legislate a National Emergency Communications Plan, a National Volunteer Policy, and Municipal Disaster Preparedness Plans in coordination with the existing Municipal Guide for Disaster Risk Management; collaborate with AMUPA with input from other CSOs such as the Association of Mayors of Panama (Asociación de Alcaldes de Panamá, ADALPA) and Township Representatives (Coordinadora Nacional de Representantes de Corregimiento, CONARE).

6 Integrate plans and policies across the national and subnational governments and critical infrastructure sectors.

DMA RECOMMENDATIONS: PLANS AND STANDARD OPERATING PROCEDURES

FINDINGS

At the municipal level, AMUPA as a non-governmental entity works with SINAPROC's local departments to support plan coordination with stakeholder community. They began developing Municipal Disaster Preparedness Plans in 2017.21 Resolution No. 732 of 2015 enabled the guide to the Development of Territorial Planning to incorporate risk management and climate change into planning. Structural codes were updated in 2015 to provision according to seismic and wind forces and enforced through local governments. We recommend:

7 Continue efforts to ensure that SOPs and plans are coordinated across all DM agencies and across sectoral plans and local governments by leveraging the existing efforts through AMUPA.

8 Designate a national actor responsible for providing technical assistance and guidance at territorial and sectoral levels for disaster risk analysis and studies on CC effects.

9 Strengthen construction code enforcement mechanisms through fully supporting of Panamanian Society of Engineers and Architects (SPIA) and engaging Panamanian Chamber of Construction (CAPAC).

DMA RECOMMENDATIONS: PLANS AND STANDARD OPERATING PROCEDURES

FINDINGS

It was observed that the NGOs with programs and missions relevant to disaster management coordinate through informal networks as opposed to fully structured systems that require active memberships and registry systems. In addition to the recommendations stated above under the Stakeholder Engagement section, we recommend:

10 Define clear roles and responsibilities at each level of government in SOPs and plans including all the relevant players; leverage resources from the private sector and the NGOs.

DMA RECOMMENDATIONS: EMERGENCY OPERATIONS CENTERS

FINDINGS

The ongoing updates to the COE plan seem to be on the right track based on the feedback our team received from SINAPROC. Updates cover EOC activation through to liaison participation (forty-seven institutions); six working tables: (1) Emergency Response; (2) Health; (3) Infrastructure; (4) Humanitarian Aid; (5) Public Security; and (6) Technical Scientific; (7) Public Relations (latest one to be added). We recommend:

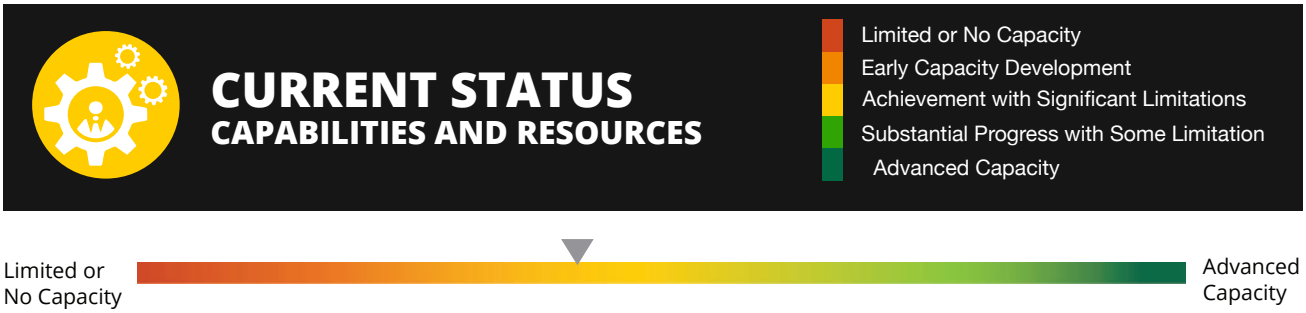
11 Explicitly define IC and management systems and structures, including decision making authority and reporting hierarchies,

12 Continue the efforts to equip the COE with required technology needs and staff to ensure continuous/ uninterrupted operations.

THE DMA

CAPABILITIES AND RESOURCES

CAPABILITIES AND RESOURCES

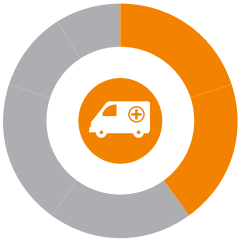


Panama is at a partially developed state given its current disaster management capabilities and resources.

Panama's national and subnational emergency services are not equipped with material nor human resources appropriate to manage known hazards due to serious and chronic lack of funding. Nevertheless, warehousing capacity is strong and disaster equipment inventories are kept up to date but are not maintained in a national database. SINAPROC has difficulty purchasing its own disaster stockpiles and emergency shelter capacity is weak. Rosters of trained professionals for critical post-disaster needs are kept informally by liaison officers at the COE and a list of active stakeholders in the recovery planning process is included in Panama's National Framework for Recovery.[18] However, all post-disaster needs are coordinated by liaison officers at the COE on an ad-hoc basis. Supplemental (surge) staffing capacity typically comes from government agencies in the form of additional staff or volunteers. The Red Cross Society of Panama (RCSP) has teams of trained volunteers for deployment when needed. If the government needs further surge personnel, a CEPREDENAC agreement allows for staffing to be supported by other Central American countries. Regarding functional capabilities like security, evacuation, search and rescue (SAR), WASH, and psychosocial recovery, Panama is at a partially developed stage with some implementation barriers generally revolving around funding issues. Another barrier in some cases is a lack of operational clarity regarding hierarchies of command.

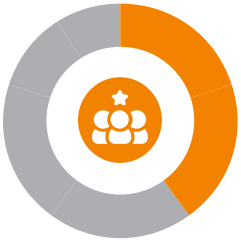
SUBTHEME STATUS
CAPABILITIES AND RESOURCES

- 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 services 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: Shelter capacity
- Status of shelter operations: Shelter suitability
- Status of shelter operations: Shelter equipment
- Warehousing capacity
- Healthcare capacity and integration of public health and medical facilities within the nation's disaster management system



Human Resources

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

Inventory of Commodities and Supplies

- Processes 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

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 materials (HAZMAT) response capacity
- National level search and rescue capabilities
- Agriculture preparedness, response, and recovery capability

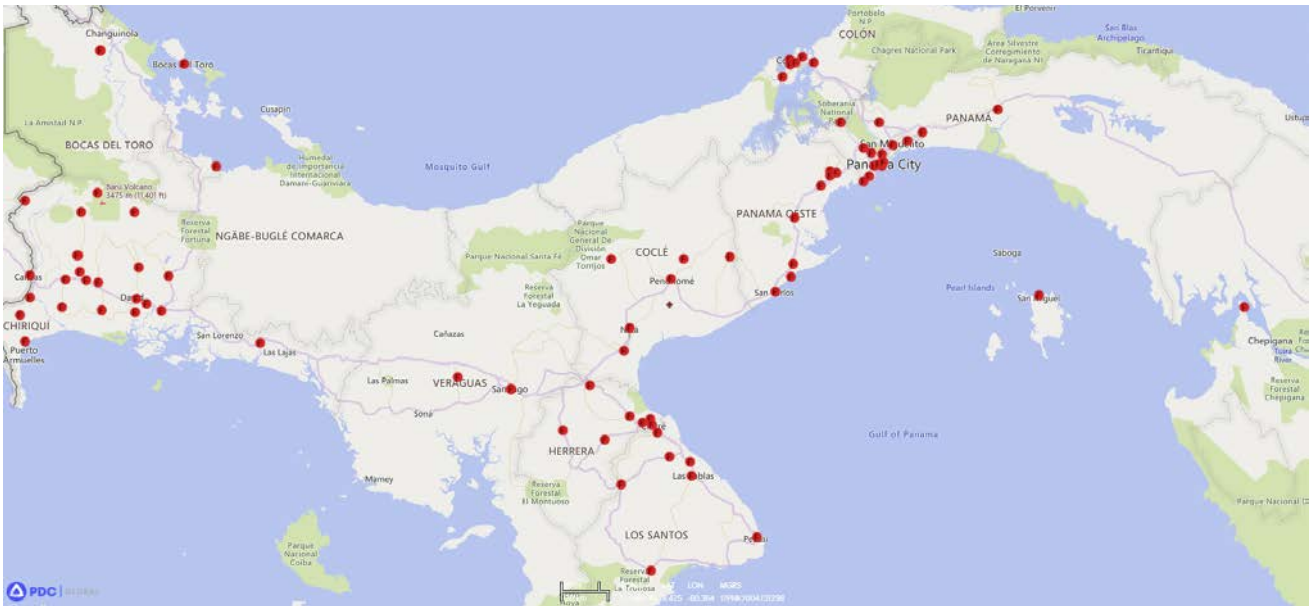


Figure 7 - Map of the Fire Stations in Panama (Source: PDC DisasterAWARE®)

Figure 8 - CLRAH Facility and Users (Source: https://www.mingob.gob.pa/hub-humanitario)

Figure 9 - SINAPROC Warehouse Facility in CLRAH (Source: PDC, April 2019)

FINDINGS AND RECOMMENDATIONS TO ACHIEVE ADVANCED CAPACITY

DMA RECOMMENDATIONS: DEDICATED FACILITIES AND EQUIPMENT, HUMAN RESOURCES

FINDINGS

Panama's emergency services at both the national and subnational levels are not equipped with material nor human resources appropriate to manage known hazards due to serious and chronic lack of funding. Nevertheless, warehousing capacity is strong and disaster equipment inventories are kept up to date – but are not maintained as a national database. SINAPROC has difficulty purchasing its own disaster stockpiles and emergency shelter capacity is weak. We recommend:

1. Increase the number of emergency services facilities by building additional fire stations that cover the response needs (double the number in the next ten years)

2. Expand the National Intelligent Alert Monitoring System (Sistema Inteligente Nacional de Monitoreo de Alertas, SINMA) for data storage and information sharing system developed by National Authority for Government Innovation (Autoridad Nacional para la Innovación Gubernamental, AIG) to fully represent all DM material, equipment, and supply inventory from SINAPROC and all partner agencies with DM resources.

3 Expand the existing efforts of SINAPROC's Local Government liaison unit of the DRR Office to assess the material resources needed for emergency response and establish procurement and maintenance mechanisms at regional and subnational levels.

4 Address DM resource requirements through formalized agreements/ contracts involving PPPs, NGO sector and other stakeholders.

5 Establish shelter inventory addressing suitability for use through a comprehensive assessment.

6 Increase shelter inventory to address 100 percent capacity needs for anticipated disasters. Conduct inspections every three years for suitability, especially for location, sanitation, safety, and security.

7 Integrate the International Organization for Migration (IOM)'s Manual for the Management of Temporary Shelter into national plans and policies for disaster management.

DMA RECOMMENDATIONS: HUMAN RESOURCES

FINDINGS

Rosters of trained professionals for critical post-disaster needs are kept informally by liaison officers at the EOC, and a list of active stakeholders in the recovery planning process is included in Panama's National Framework for Recovery. However, all post-disaster needs are coordinated by liaison officers at the EOC on an ad-hoc basis. Supplemental (surge) staffing capacity typically comes from government agencies in the form of additional staff or volunteers. The RCSP has teams of trained volunteers for deployment when needed. If the government needs further surge personnel, a CEPREDENAC agreement allows for staffing to be supported by other Central American countries. The law requires risk assessments, but there is insufficient staff to support risk assessment needs. SINAPROC only has four staff to support risk assessments in the entire country. We recommend:

8 Hire and train staff solely dedicated to civil protection planning.

9 Train and maintain sufficient skilled staff and resources to manage risk assessment needs.

10 Hire and train staff for HAZMAT response.

11 Create/upgrade and maintain rosters of trained professionals for critical post-disaster needs.

12 Increase the firefighter capacity by training, hiring, and credentialling firefighters including volunteers.

13 Leverage and expand existing NGO, private sector, and volunteer stakeholder agreements to address surge staffing needs.

DMA RECOMMENDATIONS: TARGETED FUNCTIONAL CAPABILITIES

FINDINGS

Regarding functional capabilities like security, evacuation, search and rescue, WASH, psychosocial recovery, Panama is at a partially developed stage with some implementation barriers generally revolving around funding issues. Another barrier in some cases is a lack of operational clarity regarding hierarchies of command. We recommend:

14 Integrate the nation's public health and medical facilities to the DM system through training, drills, and policymaking to improve the overall national disaster management system's capabilities. Revitalize SISED, and its original mission, to facilitate the integration.

15 Generate/maintain/update post-disaster commodity needs through scenario-based planning.

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

17 Integrate the local evacuation plans into a national standalone evacuation plan.

18 Conduct regular evacuation exercises and training ahead of seasonally anticipated flooding events.

19 Deconflict roles and responsibilities for psychosocial recovery across MIDES, National Secretariat for Children, Adolescents, and the Family (Secretaría Nacional de Niñez, Adolescencia y Familia, SENNIAF) and the Office of the First Lady.

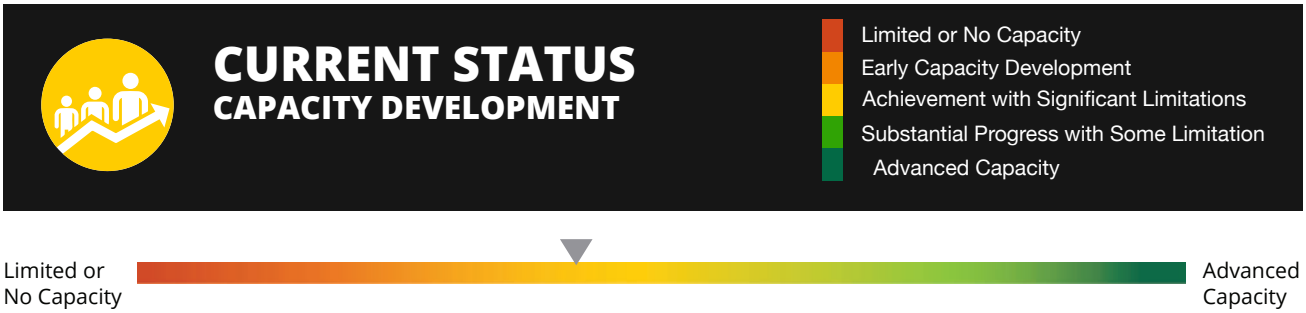
20 Deconflict roles and responsibilities for shelter protocol across MIDES, and the Office of the First Lady.

21 Continue to increase the agricultural sector preparedness, response, and recovery capacity.

THE DMA

CAPACITY DEVELOPMENT

CAPACITY DEVELOPMENT

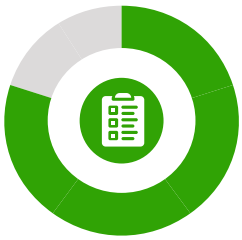


Panama is at a partially developed state regading its disaster management capacity development efforts.

SINAPROC Civil Protection Academy provides valuable training in disaster response and emergency services, but there is a need to expand training capacity and develop a formal training program with a dedicated budget, staff, and facilities. SINAPROC maintains a bi-annual training schedule and is in the process of developing an annual training schedule and catalog. Amendment to Law 71 establishes position and promotion requirements and salary scales for SINAPROC but training protocols need to be established and updated. SINAPROC conducts post-disaster reviews and evaluations after events, but requirements and SOPs are not in place for post-disaster reviews and evaluation. SINAPROC conducts evaluations of plans, policies, and SOPs, but there is no evidence that these evaluations are incorporated into updating and revising these documents. SINAPROC conducts national exercises annually and are managed by SINAPROC staff, but no formal exercise schedule exists. While MEDUCA does provide some DRR education and training to schools, there is no formalized DM and DRR curriculum in place. University of Panama (UP) and University of Americas offer bachelor and technical degrees in medical emergencies and disasters for health staff; both need to finish developing and implement the proposed post-graduate (Masters/PhD) Disaster Management programs.

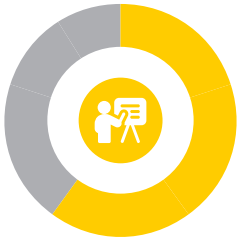
SUBTHEME STATUS
CAPACITY DEVELOPMENT

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



Formalized Capacity Development Plans and Strategies

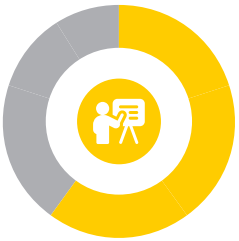
- Formalized and established training and exercise requirements
- Formalized and established position-specific competency requirements
- Coordination process for the development of disaster management capacity
- Existing disaster management and disaster risk reduction capacity plans
- Process for assessment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



Training and Education Programs and Facilities

- Jurisdictional disaster management and disaster risk reduction training
- Scope of disaster management and disaster risk reduction training and education
- Standard training delivery methods
- Existence of training schedule and/or catalog
- Maintenance of training records
- Level of exercise program implementation and staffing
- Exercise evaluation standards
- Structured annual exercise schedule
- National-level exercises
- National support for sub-jurisdictional 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 a public preparedness through an established disaster

management curriculum
- Existence of a formalized public awareness, preparedness, and resilience-building program
- Public education methods
- Involvement of community centers and public awareness/education
- Disaster preparedness informational support for the private sector



Capacity Development Monitoring and Evaluation

- Standard evaluation procedures
- Review of plans, strategies, and standard operating plans (SOPs)
- Incorporation of evaluations into plans, policies, and SOPs
- Requirements for post-disaster reviews
- Review of disaster management legislation

Offering Institution	Name of the Area	Degree Offered
University of the Americas	Medical Emergencies and Disaster[22]	Bachelor's
	Environmental Impact Assessment and Management[23]	Master's
	Logistics Management[24]	Postgraduate degree
University of Panama[25]	Disaster Prevention and Medical Support	Technical degree
Universidad Tecnológica de Panamá26	Engineering	Bachelors, Masters and PhD
Universidad Autónoma de Chiriqui[27]	MEDICAL EMERGENCIES	Bachelors

Figure 10 - Higher Education degrees offered pertinent to DM and DRR in Panama
(Source: Consejo Nacional de Evaluación y Acreditación de la Educación Universitaria de Panamá/ National Council for the Evaluation and Accreditation of University Education of Panamá CONEAUPA[28])

FINDINGS AND RECOMMENDATIONS TO ACHIEVE ADVANCED CAPACITY

DMA RECOMMENDATIONS: FORMALIZED CAPACITY DEVELOPMENT PLANS AND STRATEGIES

FINDINGS

SINAPROC conducts post-disaster reviews and evaluations after events, but requirements and SOPs are not in place for post-disaster reviews and evaluation. SINAPROC conducts evaluations of plans, policies, and SOPS and there is a Monitoring and Evaluation (M&E) framework included in PINGRD and Strategic Plan 2030 Vision.7,12 There is no evidence that these evaluations are incorporated into updated and revising plans, policies, and SOPs. We recommend:

1. Maintain exercise evaluation standards common throughout each area.

2. Periodically assess DRM capacity and resource needs through deliberative planning.

DMA RECOMMENDATIONS: FORMALIZED CAPACITY DEVELOPMENT PLANS AND STRATEGIES

FINDINGS

Some plans are not online. Sector plans are either missing or our team was not able to locate them online. We recommend:

3 Make the plans publicly available for stakeholder participation and awareness.

DMA RECOMMENDATIONS: TRAINING AND EDUCATION PROGAMS AND FACILITIES

FINDINGS

SINAPROC Civil Protection Academy provides training in disaster response and emergency rescue services but does not have an extensive training program on disaster preparedness and recovery. Therefore, it needs to be developed and integrated into its training and education operations. SINAPROC maintains a bi-annual training schedule but does not have a catalog of training. SINAPROC is in the process of developing an annual training schedule and catalog. We recommend:

4 Create/enhance a comprehensive DRM training and education curriculum that closely track emerging needs and is inclusive of stakeholders, would open opportunities to build capacity among individuals and organizations across Panama. Publishe in a catalog with a regularly occurring set schedule.

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

6 Create/enhance formal public awareness programs for preparedness and resilience building.

7 Facilitate the full participation of community centers/organizations in the promotion of disaster awareness, preparedness, and training.

8 Through chambers of commerce and other professional organizations, provide and integrate private sector into disaster preparedness programs.

DMA RECOMMENDATIONS: TRAINING AND EDUCATION PROGAMS AND FACILITIES

FINDINGS

Amendment to Law 7 establishes position and promotion requirements and salary scales for SINAPROC but training protocols need to be established and updated.

9 Establish/update training protocols for the already established position-specific competency requirements and use for staff hiring credentials.

DMA RECOMMENDATIONS: TRAINING AND EDUCATION PROGAMS AND FACILITIES

FINDINGS

SINAPROC stated there is a budget for training in 2020 and a budget is being developed for 2021 but the Government of Panama's National Fiscal Budget for Public Investments is not publicly available and official documentation needs to be made available to determine if there is a dedicated annual budget that is sufficient for training and exercises. We recommend:

10 Institutionalize DRM training with a dedicated budget, staff, and facilities.

DMA RECOMMENDATIONS: TRAINING AND EDUCATION PROGAMS AND FACILITIES

FINDINGS

SINPROC maintains training records but there is no centralized system for this information.

11 Maintain training records in a centralized system.

DMA RECOMMENDATIONS: TRAINING AND EDUCATION PROGAMS AND FACILITIES

FINDINGS

SINAPROC conducts national exercises annually in October that are managed by SINAPROC staff, but no formal exercise schedule exists.

12 Develop a formal exercise program with dedicated staff.

13 Develop a structured annual exercise schedule.

DMA RECOMMENDATIONS: TRAINING AND EDUCATION PROGAMS AND FACILITIES

FINDINGS

Law No. 38 enacted in 2015 establishes a mandatory education for Environmental Education and Integral Risk Management and designates specific functions to the Environmental Directorate of the Ministry of Education, universities, and the media. While MEDUCA does provide some DRR education and training to schools there is no formalized DM and DRR curriculum in place. University of Panama and University of Americas offer bachelor and technical degrees in medical emergencies and disasters for health staff and need to finish developing and implement the proposed post-graduate (Masters/PhD) Disaster Management program. We recommend:

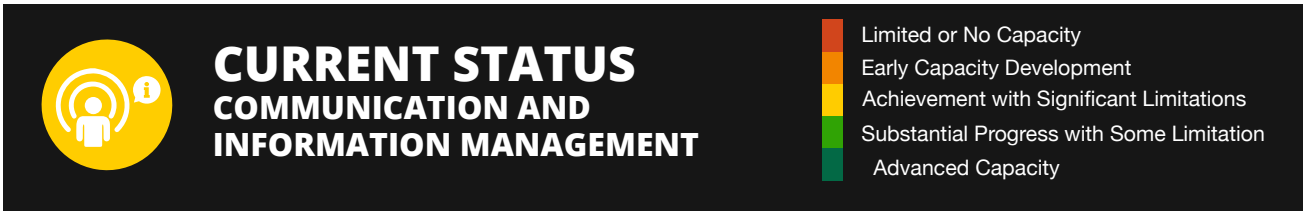
14 Empower/integrate the efforts of academia to offer relevant higher education programs at the bachelor's level at minimum that support professionalization of DM and hosting symposia.

15 Develop and implement formal DRM curricula at the K-12 education level

THE DMA

COMMUNICATION AND INFORMATION MANAGEMENT

COMMUNICATION AND INFORMATION MANAGEMENT



Panama is at a partially developed state regading its current communication and information management capabilities and resources.

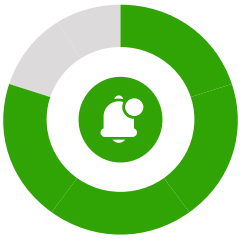
SINAPROC conducts risk assessments for a variety of hazards, but no formalized process for risk assessments exists, and sufficient staff resources do not exist to support risk assessments. SINAPROC does not have any requirements or SOPs in place for risk mapping, but SINAPROC recently developed and implemented a centralized, automated ArcGIS risk assessment platform. There is no single dedicated organization responsible for hazard monitoring in Panama. Hazard monitoring is primarily coordinated and conducted by SINAPROC as well as ETESA, ACP, Western Earthquake Observatory (Observatorio Sísmico Occidental de Panamá, OSOP), National Seismological Network (Red Sismológica Nacional, RSN), the Maritime Authority of Panama (Autoridad Maritima De Panama, AMP) and the University of Panama Geo-Science Institute (Instituto de Geociencias de la Universidad de Panamá, IGC). Doppler radar provides coverage for about 50-75 percent of Panama; 25-50 percent of the population is served by early warning systems (EWS). SINAPROC utilizes a damage evaluation and needs assessment (EDAN) methodology, but it needs to be updated. Data sharing standards exist; they are currently being updated. Data sharing across various government agencies is a challenge. SINAPROC's COE MACOE5 contain communications guidelines for disaster response, but there is no formal communications strategic plan, strategy, or SOP. No formal policy on media training exists and media training needs to be expanded to all DM staff. SINAPROC has established priorities in planning documents for special needs and vulnerable populations, but public information capabilities do not directly communicate with special-needs and vulnerable populations.

SUBTHEME STATUS
COMMUNICATION AND INFORMATION MANAGEMENT

- 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 to development decision-making



Monitoring and Notification

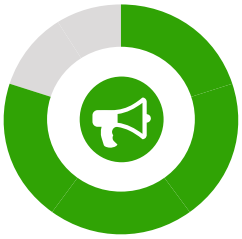
- Hazard monitoring
- Coordination of hazard monitoring
- Population coverage of hazard monitoring
- Doppler radar coverage
- Responsibilities for hazard monitoring activities
- Methods and technologies for hazard monitoring efforts
- Designated agency for the consolidation and notification of early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

Disaster Assessment

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

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



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

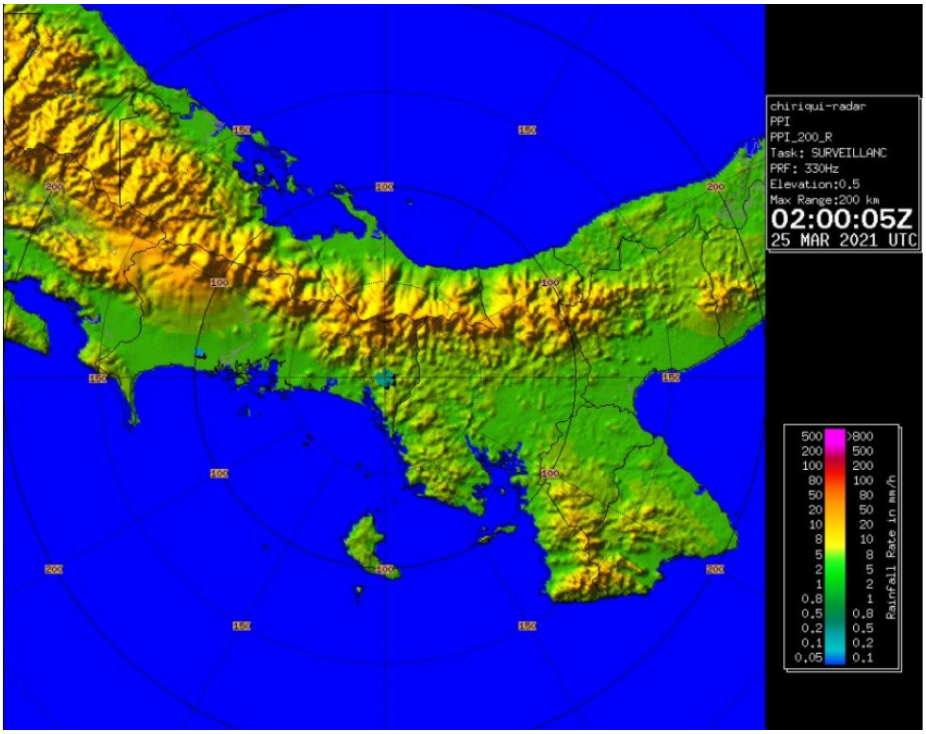


Figure 9 - SINAPROC Warehouse Facility in CLRAH (Source: PDC, April 2019)

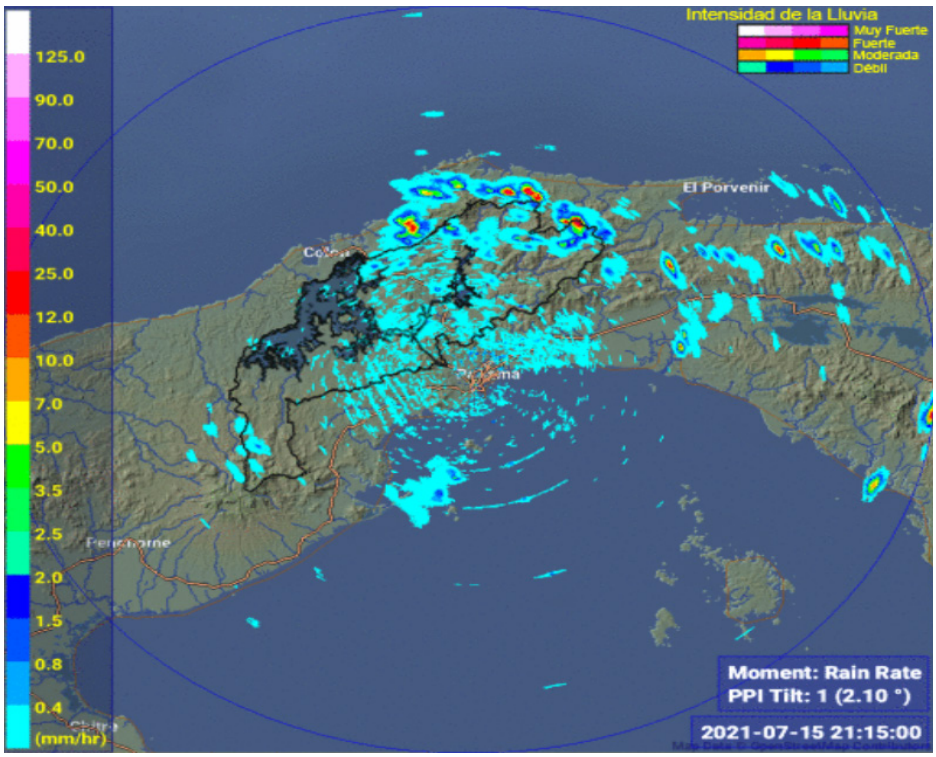


Figure 12 - Panama Canal Weather Radar (Source: ACP, 2021)

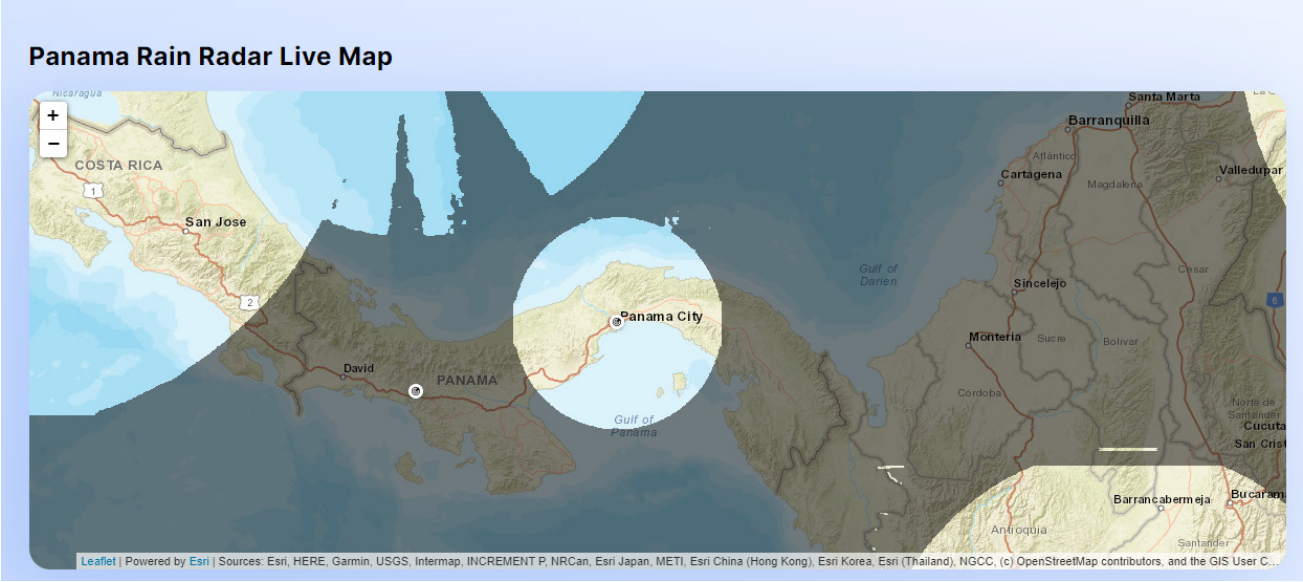


Figure 13 - Panama Canal Authority Doppler radar coverage (Source: RainViewer.com, 2021)

1. Sist_ Río Chucunaque **2.** Sist_ Bayano **3.** Sist_ Mamoní **4.** Sist_ Pacora **5.** Sist_ Cabra
6. Sist_ Tsunami **7.** Sist_ San Miguelito **8.** Sist_ Río Chagres **9.** Sist_ Río Indio **10.** Sist_ Quebro
11. Sist_ Varadero **12** Sist_Chiriquí Viejo **13.** Sist_ Volcán Barú **14.** Sist_ Changuinola **15.** Sist_ Sixaola

Figure 14 - Geographical Distribution of Early Warning Systems (Source: UNESCO, 2014, p.17)

FINDINGS AND RECOMMENDATIONS TO ACHIEVE ADVANCED CAPACITY

DMA RECOMMENDATIONS: HAZARD AND RISK ANALYSIS SYSTEMS

FINDINGS

Pursuant to Law 7[2] SINAPROC is required to conduct risk assessments. Risk assessments are conducted in an ad-hoc manner for a variety of hazards, but no formalized process for risk assessments exists. We recommend:

1. Establish and incorporate risk assessment processes and standards that include vulnerability assessments, impacts of climate change, and indigenous knowledge at the national and subnational levels.

2. Require risk assessment for DM and DRR planning efforts. (See also recommendations on the legislative actions above)

DMA RECOMMENDATIONS: HAZARD AND RISK ANALYSIS SYSTEMS

FINDINGS

Sufficient staff does not exist to support risk assessment; only four staff are available for the entire country.

3 Enhance capabilities to conduct disaster assessments through the development and use of nationally authorized assessment methodology, making it a requirement under the declarations process, and assigning adequate resources through proper training; engage all relevant DM stakeholders.

4 Train and maintain sufficient skilled staff and resources to manage risk assessment needs.

DMA RECOMMENDATIONS: HAZARD AND RISK ANALYSIS SYSTEMS

FINDINGS

Climate change is included in risk assessments like Central American Probabilistic Risk Assessment Climate change is included in risk assessments like Central American Probabilistic Risk Assessment (CAPRA)29 but is limited in scope. SINAPROC's lack of staffing and resources impede the implementation of climate change in risk assessments.

Local and indigenous knowledge is not included in risk assessment even though SINAPROC does engage with indigenous communities and provide support during disasters.

SINAPROC does not have any requirements or SOPs in place for risk mapping and there is no centralized Geographic Information System (GIS) that exists to support risk assessment and reporting. MIAMBIENTE and SINAPROC developed the Atlas of Risks30 in 2011; it is now being updated with technical assistance from Tommy Guardia National Geographic Institute. We recommend: (CAPRA)29 but is limited in scope. SINAPROC's lack of staffing and resources impede the implementation of climate change in risk assessments.

5 Institute a centralized GIS-based data management system for a common operating picture and planning efforts across all DM stakeholders, to include risk and vulnerability assessments, maps and other relevant data generated by SINAPROC, MIAMBIENTE, Tommy Guardia, and external agencies particularly the UN, International Federation of Red Cross and Red Crescent Societies (IFRC), and RCSP.

6 Establish/maintain risk mapping capacity by adequately training staff using a centralized GIS system to support risk assessment reporting at the national and subnational level.

7 Create/update/maintain a national disaster loss database linked to the national statistics agency.

8 Develop and continuously update the Atlas of Risks and integrate it to the hazard monitoring and DRM planning efforts.

DMA RECOMMENDATIONS: MONITORING AND NOTIFICATIONS

FINDINGS

There is no single dedicated organization responsible for hazard monitoring in Panama. Hazard monitoring is conducted by SINAPROC, ETESA, ACP, OSOP, RSN, AMP, and the UP-IGC. There is a lack of structured coordination for hazard monitoring between SINAPROC and ETESA.

9 Centralize the coordination of hazard monitoring for alert notification/ warning while keeping/assigning government agencies for specialized monitoring of hazards.

DMA RECOMMENDATIONS: MONITORING AND NOTIFICATIONS

FINDINGS

Doppler radar provides coverage for about 50-75 percent for Panama. The country currently has two doppler radars. (ACP-metro region and canal zone and ETESA-western region of Panama.) ACP is in the process of acquiring a second doppler radar for the Colon area.

10 Expand doppler radar coverage to the eastern region of Panama so that 75-100 percent of the country is covered.

DMA RECOMMENDATIONS: MONITORING AND NOTIFICATIONS

FINDINGS

Standard procedures exist but only cover some hazards. The UNESCO CEPREDENAC Inventory of Early Warning Systems[31] in Panama lists several hazards that do not have standard procedures in place.

11 Upgrade/acquire technologies to monitor hazards, and 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.

12 Expand Common Alerting Protocols across all government agencies in Panama 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 ACP, SINAPROC and ETESA.

DMA RECOMMENDATIONS: MONITORING AND NOTIFICATIONS

FINDINGS

Early warning systems serve 25-50 percent of the population. According to a 2012 UNESCO Report on Inventory of EWS in Panama,[32] there were eighteen systems located in four regions to cover floods, landslides, tsunamis, and volcanos. Seven early warning systems are located in Panama province, where more than thirty-three percent of the population lives.

13 Ensure/enhance EWS to target more than seventy-five percent of the population and adapt to vulnerable populations.

14 Expand the efforts for hazard monitoring to match the Sendai commitments ("The entire population is expected to be served by hazard monitoring efforts by 2024.")

15 Implement standardized practices to regularly test early warning systems for all hazards

DMA RECOMMENDATIONS: DISASTER ASSESSMENT

FINDINGS

SINAPROC conducts disaster assessments, but capabilities are limited due to insufficient staffing and resources. SINAPROC utilizes a damage evaluation and needs assessment (EDAN)[33] methodology, but it needs to be updated.

16 Update existing disaster assessment methodology and procedures and allocate sufficient financial and human resources for disaster assessments.

DMA RECOMMENDATIONS: INFORMATION COLLECTION, MANAGEMENT, AND DISTRIBUTION

FINDINGS

SINAPROC maintains all data in digital format but data at the national level is both in digital and hardcopy format. Data sharing across various government agencies is a challenge. Data sharing standards exist; they are currently being updated. Panama does not maintain a centralized GIS-based data management system.

17 SINAPROC should build a centralized repository for data, documentation, and information regarding DM and DRR through the Statistics Office.

18 Create/adopt national standards for DM data collection, management, storage, and sharing in a fully digitized format that can be shared between government, NGOs, and other stakeholders for decision making.

DMA RECOMMENDATIONS: INFORMATION COLLECTION, MANAGEMENT, AND DISTRIBUTION

FINDINGS

SINAPROC's EOC MACOE[5] contain communications guidelines for disaster response, but there is no formal communications strategic plan, strategy, or SOP.

19 Develop a formal. documented communications strategy and communications SOP for SINAPROC.

DMA RECOMMENDATIONS: MEDIA AND PUBLIC AFFAIRS

FINDINGS

No formal policy on media training exists; media training is apparently limited to lead DM officials.

20 Develop pre-scripted information bulletins for all major hazards.

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

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

DMA RECOMMENDATIONS: MEDIA AND PUBLIC AFFAIRS

FINDINGS

SINAPROC has established priorities in planning documents for special needs and vulnerable populations (Priority 4 of the UNDRR (2015) Evaluation of the State of DRR in Panama),34 but public information capabilities do not directly communicate with special-needs and vulnerable populations.

23 Address the needs of vulnerable populations by thoroughly assessing existing barriers and by using scenario-based planning.

NATIONAL RECOMMENDATIONS

NATIONAL RECOMMENDATIONS

The following national recommendations are presented based on the findings of Panama's National Disaster Preparedness Baseline Assessment, conducted by the Pacific Disaster Center in coordination with SINAPROC and other disaster management stakeholders in Panama. The recommendations focus on strengthening the culture of disaster risk reduction through comprehensive disaster management and disaster risk governance.

1 ESTABLISH A FRAMEWORK TO ADDRESS COMPREHENSIVE DISASTER MANAGEMENT (CDM)

1.1. Base it on the Central American Policy for Comprehensive Risk Management (PCGIR) of CEPREDENAC.
1.2. Leverage Law 7 and its amendments to enhance the DM structure, clarify SINAPROC's role, and institutionalize the civil career profession.
1.3. Continue the regular dialogue between the National Climate Change Committee (CONACPP), SINAPROC and the NGOs, private sector, academia, and others to advance the planned actions around climate issues.
1.4. Address the challenges related to social and territorial gaps and environmental problems in SDGs.
1.5. Require more comprehensive interventions with special emphasis on economic, social, environmental, institutional, and democratic governance areas where there are persistent structural problems.
1.6. Address the systemic and new effects brought by the COVID-19 pandemic on the vulnerable populations.
1.7. Ensure a harmonized working relationship between MNG-SINAPROC and Ministry of Public Security with clear delineation of roles in the ongoing planning updates that are based on the Central American CDM Framework (PCGIR).
1.8. Build and maintain standing decision making committees for disaster risk management beyond the Joint Task Force (FTC) to instill active stakeholder participation for a broader perspective on needs and capabilities.

2 STRENGTHEN THE LEGAL FRAMEWORK TO:

- Address implementation schedules.
- Strengthen the code use enforcements mechanisms at the local levels.
- Address vulnerable groups and gender issues,
- Mandate hazard risk assessment and management in planning:
- Require the creation of disaster risk databases incorporating frequency of occurrences associated with event intensity levels into hazard risk.
- Include disaster risk analysis and CC in the national science & technology agenda.
- Require environmental, industry, agriculture, health, education, transportation, WASH, telecommunications, energy, tourism, sectors to define the responsibility to conduct disaster risk analysis and CC effects within the scope of their competencies.

3 DEVELOP FORMAL BUDGET ARRANGEMENTS SPECIFICALLY FOR DISASTER MANAGEMENT

3.1. Establish a dedicated budget for DRM/DRR through national policy to improve Panama's DRM/DRR operational capacity.

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

3.3. Through legislation, and in revisions to Panama's strategic and emergency response plans, include detailed budgets for implementation of DRM/DRR activities.

- Establish a standalone, dedicated budget separate from ministry funds or allocate money under budget line items within existing contingency funds such as the Panama Savings Fund (FAP)
- Secure adequate funding to improve Panama's DM/DRR operational capacity,
- Tied to the Law 7 through an amendment,
- Pre-set target levels,
- Address Programmatic, administrative, and operational needs
- Address Training, education, and R&D needs
- Address capacity development funds at national and subnational levels,
- A contingency budget for immediate relief,
- Provision guidelines for access and use,
- Provision guidelines for provision of relief funds to disaster victims,

3.4. Update the Strategic Framework for Financial Management of Disaster Risk to leverage the role of DICRE of MEF.
3.5. Amend the General Budget Law of Panama to stipulate a DM budget according to the National Public Investment System (SINIP) standards.

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

4.1. Support and expand grant and loan programs, disaster insurance, and microfinance credit schemes 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 formal, affordable microfinancing mechanisms through Public-Private Partnerships (PPPs). Leverage existing disaster financing programs such as the UN Emergency Relief Fund, Caribbean Catastrophic Risk Insurance Facility (CCRIF), Inter-American Emergency Aid Fund (FONDEM), Caribbean Development Bank, and Caribbean Development Bank.
- Establish low-interest loans available to support household, business, or NGO recovery costs that are ineligible under other funding streams or options.

4.2. Strengthen catastrophic risk insurance market with proper regulatory mechanisms for affordable premiums and market solvency; work with CCRIF and private insurance companies.

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

5.1. Update and integrate all plans for a unified approach to DRR and DM
- Prepare and legislate a National Emergency Communications Plan, a National Volunteer Policy, and Municipal Disaster Preparedness Plans in coordination with the existing Municipal Guide for Disaster Risk Management and collaboration with AMUPA with input from other CSOs such as the Association of Mayors of Panama (ADALPA) and Township Representatives (CONARE).

- Develop and require the use of COOP and COG plans. Leverage the existing COOP strategy by Latin American and Caribbean Economic System (SELA) to promote quick recovery of critical services needed for the functioning of society and to ensure security.
- Periodically update the SOP and the response frameworks to address current needs through the creation of standard evaluation procedures and align with DRM policies.
- Update government plans to address short- and long-term disaster recovery needs including psychosocial recovery.
- Ensure a unified implementation of DRR provisions under the Sendai Framework across all projects with local governments. Integrate of Sustainable Development Goals (SDGs) to DRR and CCA provisions.
- Integrate plans and policies across the national and subnational government and critical infrastructure sectors.
- Make the plans publicly available for stakeholder participation and awareness.

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

- Update policies, plans, and procedures for warehousing and inventory management.
- 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.

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

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

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

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

- Continue efforts to ensure the SOPs and plans are coordinated across all DM agencies and their sectoral plans, as well as local governments leveraging the existing efforts through AMUPA.
- Define clear roles and responsibilities at each level of government in SOPs and plans. Leverage resources from the private sector and the NGOs to make the plans viable.
- Designate a national actor responsible for providing technical assistance and guidance at territorial and sectoral levels for disaster risk analysis and studies on CC effects.
- Strengthen construction code enforcement mechanisms by fully supporting of Panamanian Society of Engineers and Architects and engaging Panamanian Chamber of Construction (CAPAC).

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

- Ensure that interagency DM responsibilities are clearly mapped for effective DRM implementation within SINAPROC and across all agencies beyond response activities to include preparedness and DRR.
- Strengthen policies to ensure NGOs, private sector partners, and other sectoral organizations are comprehensively engaged in disaster management efforts in a coordinated and complementary manner. Formally integrate them into plans. Formalize and build relationships with key partners in these sectors.
- Leverage existing technical committees targeted at sectors to address hazard specific policy making.
- Fully engage higher education institutions in the technical committees through MOUs and proper funding mechanisms and tying these to the science and technology (S&T) agenda.
- Expand the activities of NGOs and private sector partners and formalize them to operate at subnational levels to address specific needs of populations.
- Create a formal NGO Association whose program/mission areas have DM.
- Leverage the NGOs under the leadership or through the guidance of the Panamanian Red Cross and SINAPROC for local level capacity building.

- Create a central inventory of the NGO and private-sector DM stakeholder community with DM program areas/missions in coordination with the Prevention department and EOC Liaison Officers (LNOs).
- Formally integrate NGOs, particularly the Red Cross Society of Panama to the National Disaster Management System for a more harmonized working relationship with SINAPROC.
- Address the needs, resource contribution capabilities, and participation of all stakeholder groups including NGOs and the private sector.
- Align strategic plans and policies to integrate SD, DM and DRR and for all phases through stakeholder support and input.
- Strengthen the participation of stakeholders through the creation of committees.
- Through legal provisions, establish robust governance foundation for emergency preparedness related activities.
- Maintain and establish a private sector resource and logistics capability database by leveraging the existing database created through CLRAH.
- Expand policies to include PPP by leveraging and strengthening partnerships across the government and private sector to include but not limited to, the Panama Canal Authority (ACP), ETESA, MoviStar, Civil Aeronautics Authority, Panamanian Chamber of Construction (CAPAC), Panamanian Society of Engineers and Architects, National Chamber of Transport , National Council of Private Enterprise (CONEP), Logistics Business Council of Panama (COEL), Mortgage Bank of Panama, Agricultural Marketing Institute (IMA) - beyond response to include sectoral plan preparedness and disaster risk reduction.

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

- Create/enhance formal public awareness programs for preparedness and resilience building.
- Include academia in DM by linking DM research and training needs to academic programs.
- Build on the existing links between SINAPROC and Ministry of Education (MEDUCA) and the University of Panama.
- Develop and establish formal agreements between SINAPROC's Academy of Civil Protection and the leading universities such as the UTP and UP.
- Include disaster risk analysis and climate change in the national S&T agenda.
- Periodically collect political approval ratings/assess household preparedness levels in order to address core DRR/DM needs and gaps within communities, to measure and enhance public perception of DM activities. Garner citizen participation through

exercises.

- Periodically conduct surveys to assess the DRM/DRR needs of vulnerable populations within each jurisdiction.
- Develop and implement a formal DRM curriculum for the K-12 education level
- Reactivate the family preparedness campaign with proper resources and funding.
- Enhance/instill public training/education programs for pre-disaster awareness.

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

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

- Increase the number of emergency services facilities by building additional fire stations that cover the response needs (double the number in the next ten years)
- Expand the SINMA system for data storage and information sharing developed by National Authority for Government Innovation (AIG) to fully represent all DM material, equipment, and supply inventory from SINAPROC and all partner agencies with DM resources.
- Expand the existing efforts of SINAPROC's Local Government liaison unit of the DRR Office to assess the material resources needed for emergency response and establish procurement and maintenance mechanisms at subnational levels.
- Generate/maintain/update post-disaster commodity needs through scenario-based planning.
- Address DM resource requirements through formalized agreements/contracts involving PPPs, NGO sector, and other stakeholders.
- Establish shelter inventory and address suitability for use through a comprehensive assessment.
- Increase shelter inventory to address one hundred percent of need for anticipated disasters. Conduct suitability inspections every three years especially for location, sanitation, safety, and security.
- Integrate IOM's Manual for the Management of Temporary Shelter into national plans and policies for disaster management.
- Deconflict roles and responsibilities for psychosocial recovery across MIDES, SENNIAF, and the Office of the First Lady.
- Deconflict roles and responsibilities for Shelter protocol across Ministry of Housing, Ministry of Social Development (MIDES), and the Office of the First Lady.

7.2. Enhance/update evacuation and WASH plans; likewise for the safety and security needs of disaster impacted populations with particular emphasis on the vulnerable including elderly, disabled, women, children, refugees and low-income citizens, at the national and subnational levels.
- Integrate the various local evacuation plans that exist into a national standalone evacuation plan.
- Conduct regular evacuation exercises and training ahead of seasonally anticipated flooding events.

7.3. Continue to increase the agricultural sector preparedness, response and recovery capacity.

7.4. Formalize the disaster declaration process, vertical cooperation mechanisms, and requisition of human and material resources during disasters
- Strengthen/empower subnational level DRM structures
- Strengthen/facilitate international cooperation during disasters

7.5. Integrate the nation's public health and medical facilities to the DM system through training, drills, and policymaking to improve the overall national disaster management system's capabilities. Revitalize SISED, and its original mission, to facilitate the integration.

8 FORMALIZE INCIDENT COORDINATION AND EMERGENCY OPERATIONS

8.1. Explicitly define IC and management systems and structures, including decision making authority and reporting hierarchies.

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

9 EXPAND THE NATIONAL TRAINING AND EXERCISE PROGRAM WITH SINAPROC AS LEAD AGENCY

- Create/enhance a comprehensive DRM training and education curriculum that closely tracks emerging needs, is inclusive of stakeholders, and would open opportunities to build capacity among individuals and organizations across Panama. Publish in a catalogue with a regularly occurring set schedule.
- Develop a formal exercise program with dedicated staff.
- Develop a structured annual exercise schedule.
- Maintain exercise evaluation standards common throughout each area.
- Periodically assess DRM capacity and resource needs through deliberative planning.
- Institutionalize DRM training with a dedicated budget, staff, and facilities.
- Maintain training records in a centralized system.
- Provide material, technical, and staffing support to subnational level training and exercises.
- Train and maintain sufficient skilled staff and resources to manage risk assessment needs.
- Facilitate the full participation of community centers/organizations in the promotion of disaster awareness, preparedness, and training.
- Through chambers of commerce and other professional organizations, provide and integrate the private sector into disaster preparedness programs.

10 ADVANCE PROFESSIONALIZATION OF THE DRM FIELD

- Mitigate high staff turnover and establish competencies through the provisions of Law 541 & 494 to ensure an established civil security career pathway and continuity in policies and planning in SINAPROC for effective DM and DRR.
- Abandon the practice of political/discretionary appointments.
- Require relevant bachelor's and/or master's degrees for key leadership positions by associating those to relevant academic offerings and with proper funding mechanisms.
- Address the short-term staffing needs in key critical DM functional areas.
- Institute and expand training programs and exercise requirements; link to

competencies in key leadership positions and for all relevant DM staff, including the media.
- Establish incident-specific proxy leaderships depending on the nature of the disaster.
- Empower/integrate the efforts of academia to offer education programs at the bachelor's level and higher that support professionalization of DM
- Establish/update training opportunities for the already established position-specific competency requirements and make staff hiring credentials contingent upon completion of training.

11 INSTITUTIONALIZE MULTI-HAZARD MAPPING AND RISK AND VULNERABILITY ASSESSMENTS

- Require and incorporate risk assessment for DM and DRR planning efforts,
- Establish risk and vulnerability assessment processes and standards at national and subnational levels that incorporate indigenous knowledge and are factored into DM and DRR planning efforts
- Create/adopt national standards for DM data collection, management, storage, and sharing in fully digitized format which can be shared between government and NGOs and other stakeholders for decision making.
- Institute a centralized GIS-based data management system for a common operating picture and planning efforts for all DM stakeholders to include risk and vulnerability assessments, maps and other relevant data generated by SINAPROC, MIAMBIENTE, Tommy Guardia, and external agencies particularly the UN, IFRC, and RCS.
- Establish/maintain risk mapping capacity and a centralized GIS system to support risk assessment reporting at the national and subnational level by adequately training of staff.
- Create/update/maintain a national disaster loss database linked to the national statistics agency.
- Develop and continuously update the Atlas of Risks and integrate it to the hazard monitoring and DRM planning efforts.

12 STRENGTHEN MULTI-HAZARD MONITORING AND EARLY WARNING CAPABILITIES

12.1. Centralize the coordination of hazard monitoring for alert notification/warning while keeping/assigning government agencies to specialized monitoring of hazards.

12.2. 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.")

- Expand doppler radar coverage to the eastern region of Panama so that 75-100 percent of the country is covered.
- Ensure/enhance EWS to target more than seventy-five percent of the population; adapt for vulnerable populations.
- Upgrade/acquire technologies to monitor hazards, and 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 dissemination of information before, during, and after a disaster.
- Expand Common Alerting Protocols for all government agencies 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 ACP, SINAPROC and ETESA.
- Implement standardized practices to regularly test early warning systems for all hazards

13 PROMOTE DATA COLLECTION, MANAGEMENT, AND SHARING

- Enhance capabilities to conduct disaster assessments through the development and use of nationally authorized assessment methodology, making a requirement under declarations process, and assigning adequate resources through proper training; engage all relevant DM stakeholders.
- Update existing disaster assessment methodology and procedures and allocate sufficient financial and human resources for disaster assessments.
- Update data sharing standards at the national level.
- SINAPROC: Build a centralized repository for data, documentation, and information regarding DM and DRR through the Statistics Office.
- SINAPROC: Secure funding for staff and resources to digitize documents that are currently paper based.

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

- Develop pre-scripted information bulletins for all major hazards.
- Leverage publicly generated information from 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.

13.2. Develop a formal, documented communications strategy and communications SOP for SINAPROC.

- Include a communication strategy to directly communicate with special-needs and vulnerable populations based on SINAPROC's already established priorities in planning documents (Priority 4 of the UNDRR, 2015).

14 IDENTIFY CAUSAL EFFECT OF MIGRATION TO REDUCE POPULATION PRESSURES

15

CREATE PROGRAMS TO INCREASE ECONOMIC CAPACITY

16

CREATE PUBLIC HEALTH PROGRAM TO INCREASE HEALTH CARE CAPACITY AND REDUCE STRAIN ON MEDICAL SYSTEMS

17

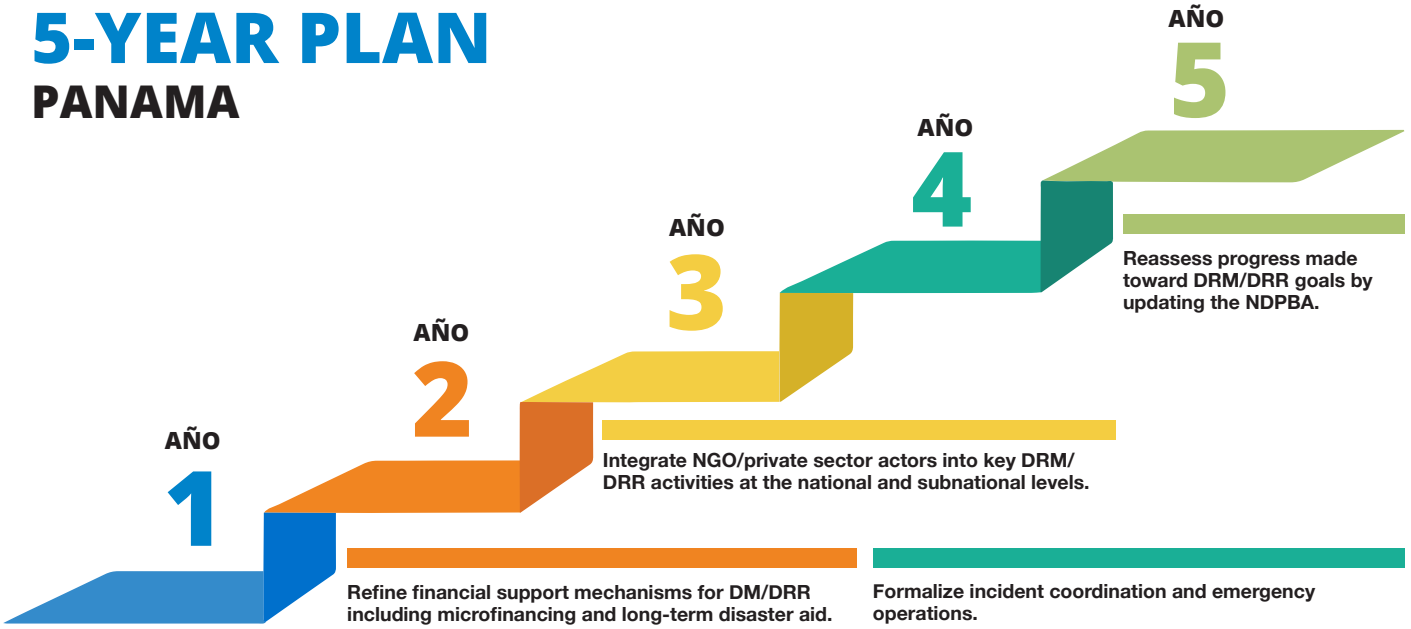
CREATE PROGRAMS TO INCREASE PARTICIPATION IN CIVIL SOCIETY AND PROVIDE MORE OPPORTUNITIES FOR WOMEN AND GIRLS

18

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

18.1. 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 Panama's Disaster Risk Reduction and Sustainable Development Goals for a more resilient nation

5-YEAR PLAN
PANAMA



Establish a comprehensive framework to address Comprehensive Disaster Management (CDM).

Strengthen the legal framework.

Develop formal budget arrangements specifically for disaster management.

Formally develop, integrate, and regularly update plans and SOPs.

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

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

Advance professionalization of the DRM field.

Institutionalize multi-hazard mapping and risk and vulnerability assessments.

Create public health program to increase health care capacity and reduce strain on medical systems.

Create programs to increase participation in civil society and provide more opportunities for women and girls.

Integrate NGO/private sector actors into key DRM/DRR activities at the national and subnational levels.

Expand the national training and exercise program with SINAPROC as lead agency.

Strengthen multi-hazard monitoring and early warning capabilities.

Promote data collection, management, and sharing.

Identify causal effect of migration to reduce population pressures.

Formalize incident coordination and emergency operations.

Create programs to increase economic capacity.

Reassess progress made toward DRM/DRR goals by updating the NDPBA.

PROVINCE RISK PROFILES

SUBNATIONAL ASSESSMENT RESULTS

Download Province Risk profiles:
https://www.pdc.org/wp-content/uploads/NDPBA-PAN-Subnational-Profiles-Merged.pdf

PROVINCE RISK PROFILES

The subnational report developed for each province offers a more detailed understanding of risk in Panama. These are provided separately from this report (linked to the left) and include drivers of vulnerability, coping capacity, and resilience; a comparison of each province with the overall country; and strategic, data-driven, actionable recommendations.

Each provincial recommendation looks at one of the top four drivers of resilience through the lens of the existing national disaster management structure in Panama. The recommendations are designed to be concise, actionable, and supported by the 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 province in Panama, 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 provinces in Panama.

NDPBA
RESOURCES

APPENDIX A
RVA METADATA

Multi-Hazard Exposure			
Subcomponent: Raw Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Raw Multi-Hazard Population Exposure	Pacific Disaster Center	2021	Raw multi-hazard population exposure represents an estimation of the number of people exposed to one or more of seven hazards.

Notes

Hazard exposure zones:

Flood: hazard zone is based on World Resources Institute (WRI) flood susceptibility maps for inland flooding based a 500-year return period.

Earthquake: Hazard zone is based on the Munich Reinsurance Company's (Munich Re) World Map of Natural Hazards, Global Earthquake Intensity Zone Layer, obtained through the United Nations Environmental Programme/ Global Resource Information Database (UNEP/GRID). Earthquake Intensity of MMI VII and above were used for exposure analysis.

Landslide: Hazard zones were developed by Pacific Disaster Center using a simple scoring system based on slope, aspect, land cover, and the presence of roads. Slope and aspect were calculated from the Multi-Error-Removed Improved-Terrain (MERIT) DEM. Landslide susceptibility was classified on a relative scale. Areas of 'very high', and 'high' 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 2000 to May 2021. A weighted kernel density estimation algorithm was applied to the data set using fire radiative power (FRP). Areas showing 'high' and 'medium' fire density (based on natural breaks) were used as inputs for exposure analysis.

Storm Surge: Areas affected by storm surge hazards were developed by Pacific Disaster Center. The maximum potential inundation was calculated using the Multi-Error-Removed Improved-Terrain (MERIT) DEM and a bathtub flood model.

Tsunami: Hazard Zone based on Global Assessment Report (GAR) 2015 Tsunami Runup with a 500-year return period.

Sea-Level Rise: Hazard zone based on areas susceptible to sea-level rise and flooding. Data gathered from Miambiente, the Panamanian Ministry of the Environment 2019.

APPENDIX A
RVA METADATA

Multi-Hazard Exposure			
Subcomponent: Raw Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Raw Multi-Hazard Economic Exposure	Pacific Disaster Center	2021	Raw multi-hazard economic exposure represents an estimation of the cumulative replacement cost of economic stock exposed to one or more of seven hazards.
Notes			
See above for detailed description of hazard zones.			

Multi-Hazard Exposure			
Subcomponent: Relative Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Relative Multi-Hazard Population Exposure	Pacific Disaster Center	2021	Cumulative raw count of person units exposed to multiple hazards, per capita.
Notes			
See above for detailed description of hazard zones.			

APPENDIX A
RVA METADATA

Multi-Hazard Exposure			
Subcomponent: Relative Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Relative Multi-Hazard Economic Exposure	Pacific Disaster Center	2021	Cumulative value of economic capital stock exposed to multiple hazards, divided by total economic capital stock value of the province.
Notes			
See above for detailed description of hazard zones.			

Vulnerability				
Subcomponent: Economic Constraints				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Economic Dependency Ration	Instituto Nacional de Estadística y Censo (INEC) and Panama en Cifras, Panamá en Cifras years 2013 - 2017.	2017	Economic dependency is calculated as the ratio of non-working, dependent age population (aged 0 to 14, and 65 or older) to working age population (aged 15 to 64).	
Poverty	Banco Interamericano de Desarrollo Mapa de Información Económica de la República de Panamá (MINERPA)	2017	Percentage of the population in poverty.	

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Access to Information Vulnerability				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent of Households without Internet Access	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2019	2019	Percentage of households with no Internet access.	
Percent of Households without Television	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2019	2019	Percentage of households withAno television.	
Percent of Households with No Radio	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2019	2019	Percentage of households with no radio.	
Average Years of School	Instituto Nacional de Estadística y Censo (INEC), Estadísticas del Trabajo: Encuesta de Mercado Laboral, Agosto 2019	2019	Average years of school.	
Net School Enrollment	Ministerio de Educación (MEDUCA), Tasa Neta por Provincia y Comarcas. 2016 -2018	2018	Net school matriculation rate for children aged 6-17 years.	
Illiteracy Rate	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2018.	2018	Percentage of the population (aged 10 years and older) that cannot read or write.	

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Access to Clean Water Vulnerability				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent of Households without Access to Improved Water	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2018.	2018	Percentage of households without access to improved drinking water services.	
Percent of Households with Access to Improved Sanitation.	Instituto Nacional de Estadística y Censo (INEC) and UNICEF Multiple Indicator Cluster Survey, 2013	2013	Percentage of households with access to improved sanitation facilities.	

Vulnerability				
Subcomponent: Vulnerable Health Status				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Infant Mortality Rate	Instituto Nacional de Estadística y Censo (INEC) Estadísticas Vitales, Volumen III - Defunciones: Año 2017	2017	Average infant mortality rate per 1,000 live births, 2013 to 2017.	
Maternal Mortality Rate	Instituto Nacional de Estadística y Censo (INEC) Estadísticas Vitales, Volumen III - Defunciones: Año 2017	2017	Average maternal mortality rate per 100,000 live births, 2013 to 2017.	Moderate stunting = height-for-age below -2 standard deviations from the WHO Child Growth Standards median; Severe Stunting = height-for-age below -3 standard deviations from the WHO Child Growth Standards median.
Life Expectancy	Ministerio de Salud (MINSA), Boletin Estadistico Anuario, 2017	2017	Life expectancy at birth.	

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Vulnerable Health Status				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Prevalence of Stunting	Secretaria Nacional para el Plan de Seguridad Alimentaria y Nutricional (SENAPAN)	2013	Prevalence of moderate to severe stunting (low height for age), among children aged 6 to 9 years who are in the first grade.	Moderate stunting = height-for-age below -2 standard deviations from the WHO Child Growth Standards median; Severe Stunting = height-for-age below -3 standard deviations from the WHO Child Growth Standards median.
Disability	Instituto Nacional de Estadística y Censo (INEC) Encuesta de Propósitos Múltiples, Marzo 2019	2019	Prevalence of disability.	
Dengue Cases per 100,000 persons	Ministerio de Salud (MINSA), Indicadores Basicos de Salud, 2017	2017	Registered dengue cases per 100,000 people.	
Malaria Cases per 100,000 persons	Ministerio de Salud (MINSA), Indicadores Basicos de Salud, 2017	2017	Registered malaria cases per 100,000 people.	
AIDS cases per 100,000 persons	Ministerio de Salud (MINSA), Indicadores Basicos de Salud, 2017	2017	Registered AIDS cases per 100,000 people.	
Tuberculosis cases per 100,000 persons	Ministerio de Salud (MINSA), Indicadores Basicos de Salud, 2017	2017	Registered tuberculosis cases per 100,000 people.	

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Population Pressures				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Average Annual Total Population Change	Instituto Nacional de Estadística y Censo (INEC), Boletín 14. Estimaciones y Proyecciones de la Población de la República, por Provincia y Comarca Indígena, según sexo y edad: AÑOS 2000-30	2013 - 2018	Average annual percentage of total population change for the period 2013 – 2018.	
Average Annual Urban Population Change	Instituto Nacional de Estadística y Censo (INEC), Panama Population and Housing Census 2010, 2020 Urban Population Estimates	2010 - 2020	Average annual percentage of urban population change for the period 2010 – 2020.	

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Environmental Stress				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Water Withdrawal	Instituto Nacional de Estadística y Censo (INEC), Panama en Cifras 2013 - 2017	2017	Water consumption, expressed as a percentage of the total water produced.	Reporting of consumption figures was combined for Darien and Panama Este. As a result, Panama Este Production was included with Darien, and Panama Este Consumption was removed from Panama Province.
Livestock Density	Instituto Nacional de Estadística y Censo (INEC), Volumen I. Resultados Finales Básicos, VII Censo Nacional Agropecuario, 2011	2010	Total count of cows, pigs, goats, buffalo, and sheep per square kilometer of agricultural land.	
Percent Forest Cover Lost	University of Maryland Global Forest Change Dataset.	2018	Estimated percentage of forest lost between the years of 2000 and 2018.	

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Gender Inequality				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Female to Male Secondary Education Enrollment.	Ministerio de Educación (MEDUCA), Tasa Neta por Provincia y Comarcas. 2016 -2018	2018	Ratio of female to male secondary education enrollment rates.	
Female to Male Economic Activity	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2019	2019	The ratio of female to male economic activity rates (aged 15 and older).	
Proportion of Female Seats in Local Government	Tribunal Electoral de Panamá	2020	Proportion of congressional, mayoral, and district council seats that are occupied my female representatives.	

APPENDIX A
RVA METADATA

Coping Capacity				
Subcomponent: Economic Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
GDP Per Capita	Banco Interamericano de Desarrollo Mapa de Información Económica de la República de Panamá (MINERPA)	2017	GDP per capita.	
Median Monthly Salary	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2019	2019	Medium monthly salary in USD.	
Municipal Income per Capita	Instituto Nacional de Estadística y Censo (INEC) and Panama en Cifras, Panamá en Cifras years 2013 - 2017.	2017	Municipal income per capita (USD).	

APPENDIX A
RVA METADATA

Coping Capacity				
Subcomponent: Governance				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Voter Participation Rate	Tribunal Electoral de Panamá	2019	Rate of registered voter participation in 2019 Presidential Election.	
Public Garbage Collection	Instituto Nacional de Estadística y Censo (INEC), Censos de Población y Vivienda de Panamá, 2010	2010	Percentage of households receiving public garbage collection.	
Crime Rate per 1,000 Persons	Dirección del Sistema Nacional Integrado de Estadística Criminal (SIEC), Delitos de Alto Impacto Registrados en la República de Panamá, según provincia: año 2017 - 2018	2018	High impact crime rate per 1,000 persons.	High impact crimes included homicide, theft, personal injury, simple robbery, armed robbery, rape, and domestic violence.
Crime Syndicates 1,000 Persons	Instituto Nacional de Estadística y Censo (INEC), Indicadores Sociales: Años 2012-2016	2016	Crime syndicates per 1,000 persons.	

Coping Capacity				
Subcomponent: Environmental Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent Protected Area	Smithsonian Tropical Research Institute (STRI), Ministerio de Ambiente (MiAMBIENTE), Instituto Nacional de Estadística y Censo (INEC), Estadísticas Ambientales 2014-18.	2006 - 2018	Percentage of each province that is designated as a protected area.	
Reforested Area	Instituto Nacional de Estadística y Censo (INEC) and Panama en Cifras, Panamá en Cifras years 2013 - 2017.	2017	Percentage of each province that is has been reforested.	

APPENDIX A
RVA METADATA

Coping Capacity				
Subcomponent: Health Care Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Hospital Beds per 10,000 Persons	Instituto Nacional de Estadística y Censo (INEC), Servicios de Salud: Año 2017.	2017	Hospital beds per 10,000 persons.	
Physicians per 10,000 Persons	Instituto Nacional de Estadística y Censo (INEC), Servicios de Salud: Año 2017.	2017	Physicians per 10,000 persons.	
Nurses per 10,000 Persons	Instituto Nacional de Estadística y Censo (INEC), Servicios de Salud: Año 2017; MINSA Indicadores Basicos de Salud, 2016	2017	Nurses per 10,000 persons.	For Comarca Embera, the data source is: MINSA Indicadores Basicos de Salud, 2016
Distance to Hospital	Pacific Disaster Center (estimated distances), Smithsonian Tropical Research Institute, OpenStreetMap (Hospitals)	2020	Average distance (km) to the nearest hospital from populated areas of each province.	
Immunization Coverage (DTP3)	Instituto Nacional de Estadística y Censo (INEC) and UNICEF Multiple Indicator Cluster Survey, 2013	2013		

Coping Capacity				
Subcomponent: Energy Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Public Electricity	Instituto Nacional de Estadística y Censo (INEC), Censos de Población y Vivienda de Panamá, 2010	2010	Percentage of households connected to the electrical grid from the electric company	

APPENDIX A
RVA METADATA

Coping Capacity				
Subcomponent: Communications Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Households with Fixed Phone	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2019	2019	Percentage of households with a fixed residential phone line.	
Households with Mobile Phone	Instituto Nacional de Estadística y Censo (INEC), Encuesta de Propósitos Múltiples, Marzo 2019	2019	Percentage of households with at least one mobile phone.	

Coping Capacity				
Subcomponent: Transportation Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Road Density	Instituto Nacional de Estadística y Censo (INEC) and Panama en Cifras, Panamá en Cifras years 2013 – 2017; OpenStreetMap	2017	Density of road networks (km) per land area (square km).	For Comarca Embera, the data source is: OpenStreetMap, 2020.
Average Distance to Port Facility	PDC (Distance estimation), Autoridad Maritima De Panama (Seaports), Ourairports, OpenstreetMap (Airports)	2020	Average distance (in km) to the nearest airport or seaport for each province.	

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