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# Guatemala

**National Disaster Preparedness Baseline Assessment -  
Final Report**



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*Table 1. Record of Changes*

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- Coordinadora Nacional para la Reducción de Desastres
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- Ministerio de Defensa Nacional
- Ministerio de Desarrollo Social
- Ministerio de Economía
- Ministerio de Educación
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- United States Agency for International Development
- United States Embassy
- Universidad del Valle de Guatemala

## Acronyms

CC	Coping Capacity
CDM	Comprehensive Disaster Management
CEPREDENAC	Centro de Coordinación para la Prevención de los Desastres Naturales en América Central
COMRED	Coordinadora Municipal para la Reducción de Desastres
CONRED	Coordinadora Nacional para la Reducción de Desastres
DM	Disaster Management
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EHP	Equipo Humanitario de País
EOC/COE	Emergency Operations Center/Centro de Operaciones de Emergencia
ESEGIR	Escuela Superior de Estudio en Gestión Integral del Riesgo
GDP	Gross Domestic Product
ICC	Instituto Privado de Investigación sobre Cambio Climático
IGN	Instituto Geográfico Nacional
INE	Instituto Nacional de Estadísticas
INGO	International Non-governmental Organization
INSIVUMEH	Instituto Nacional de Sismología, Vulcanología, Meteorología e Hidrología
JICA	Japan International Cooperation Agency
LR	Lack of Resilience
MAGA	Ministerio de Agricultura, Ganadería y Alimentación
MDN	Ministerio Nacional de Defensa
MHE	Multi-Hazard Exposure
MHR	Multi-Hazard Risk
MINFIN	Ministerio de Finanzas Públicas
MOE	Ministerio de Educación
MOH	Ministerio de Salud Pública
MOU	Memorandum of Understanding

## NDPBA Guatemala Final Report: Acronyms

NDMO	National Disaster Management Organization
NDPBA	National Disaster Preparedness Baseline Assessment
NEOC/COEN	National Emergency Operations Center/Centro de Operaciones de Emergencia Nacional
NGO	Non-governmental Organization
NFDR	Fondo Nacional para la Reducción de Desastres
OCHA	Office for the Coordination of Humanitarian Affairs
PDC	Pacific Disaster Center
REDHUM	Humanitarian Information Network
RVA	Risk and Vulnerability Assessment
SAT	Sistema de Alerta Temprana
SEGEPLAN	Secretaría de Planificación y Programación
SOP	Standard Operating Procedure
SOSEP	Secretaría de Obras Sociales de la Esposa del Presidente
V	Vulnerability



# Executive Summary

This report details the final results of the National Disaster Preparedness Baseline Assessment (NDPBA) Project conducted in coordination with, and in support of, stakeholders in Guatemala. The goal of this project was to assess disaster risk at the subnational level and place it in the context of disaster risk reduction (DRR) efforts currently underway in Guatemala. The NDPBA provides a baseline for evidence-based DRR decision making, while simultaneously supporting the enhancement of data holdings to establish future trends in the drivers of disaster risk.

The NDPBA project provides a repeatable and measurable approach to examining key elements of DRR. The NDPBA approach consists of distinct yet complimentary activities (see Figure 1), including:

- Focused stakeholder engagements;
- A detailed subnational Risk and Vulnerability Assessment (RVA) that included the following elements: multi-hazard exposure, vulnerability, coping capacity, resilience, and multi-hazard risk;
- A review of national and subnational Comprehensive Disaster Management (CDM) capabilities to identify challenges and provide recommendations for strengthening preparedness and response;
- A proposed five-year plan including recommendations to build capacity and capability; and
- Data integration and information sharing.



Figure 1. NDPBA Activities

The data and final analysis provided in this report are integrated into the Pacific Disaster Center’s (PDC) decision-support system known as DisasterAWARE™, allowing for open and free access to critical DRR data and information. Access to the system may be requested through [ndpba@pdc.org](mailto:ndpba@pdc.org).

## Findings

### Risk and Vulnerability Assessment

The population in Guatemala experiences very high levels of exposure to seismic activity and tropical cyclone winds. Over 98% of the population are exposed to seismic activity, and over 75% of the population are exposed to tropical cyclone activity. Smaller proportions of the population are also exposed to volcanic activity, flooding, and landslides. See Figure 2 for total population exposed to specific hazards.

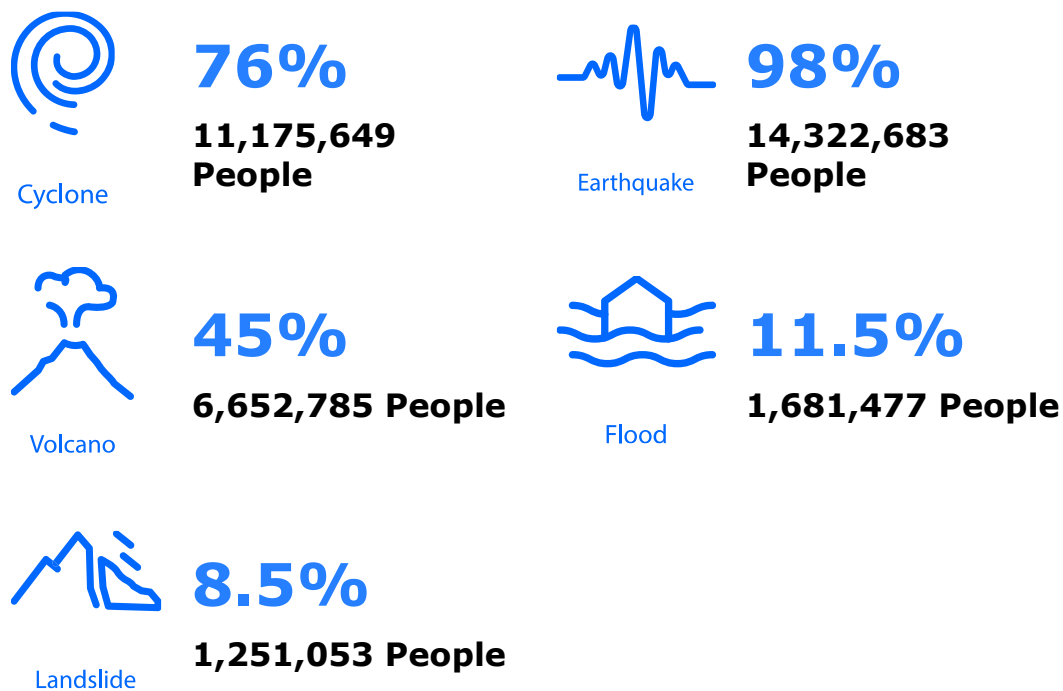


Figure 2. Population exposure to hazards in Guatemala

Table 2 provides a summary of the component results for Multi-Hazard Risk (MHR), Multi-Hazard Exposure (MHE), Vulnerability (V), Coping Capacity (CC), including index scores, and relative ranking among the 22 departments. A rank of 1 corresponds to a high score (e.g., high multi-hazard risk), while a rank of 22 indicates a low score (e.g., low multi-hazard risk).

Table 2. Guatemala Multi-Hazard Risk (MHR) Index scores, rankings, and component indices, by department

Department	Multi-Hazard Risk		Multi-Hazard Exposure		Vulnerability		Coping Capacity		Department Risk Level
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
<b>Quiché</b>	0.632	1	0.621	9	0.587	4	0.311	20	<b>Very High</b>
<b>Totonicapán</b>	0.629	2	0.684	5	0.64	2	0.438	11	<b>Very High</b>
<b>Chimaltenango</b>	0.586	3	0.722	2	0.441	13	0.405	14	<b>Very High</b>
<b>Alta Verapaz</b>	0.583	4	0.353	18	0.707	1	0.311	21	<b>Very High</b>
<b>San Marcos</b>	0.576	5	0.598	10	0.519	8	0.389	18	<b>High</b>
<b>Escuintla</b>	0.563	6	0.674	7	0.412	17	0.397	16	<b>High</b>
<b>Sololá</b>	0.56	7	0.709	3	0.488	10	0.515	6	<b>High</b>
<b>Guatemala</b>	0.557	8	0.913	1	0.3	22	0.541	5	<b>High</b>
<b>Retalhuleu</b>	0.546	9	0.643	8	0.411	18	0.418	12	<b>High</b>
<b>Huehuetenango</b>	0.541	10	0.471	12	0.466	11	0.316	19	<b>Moderate</b>
<b>Suchitepéquez</b>	0.539	11	0.58	11	0.434	15	0.397	15	<b>Moderate</b>
<b>Jalapa</b>	0.523	12	0.392	17	0.572	6	0.396	17	<b>Moderate</b>
<b>Jutiapa</b>	0.513	13	0.462	13	0.529	7	0.453	9	<b>Moderate</b>
<b>Quetzaltenango</b>	0.505	14	0.694	4	0.44	14	0.619	1	<b>Low</b>
<b>Izabal</b>	0.47	15	0.407	16	0.441	12	0.439	10	<b>Low</b>
<b>Santa Rosa</b>	0.469	16	0.425	14	0.397	19	0.414	13	<b>Low</b>
<b>Baja Verapaz</b>	0.469	17	0.413	15	0.5	9	0.507	7	<b>Low</b>
<b>Sacatepéquez</b>	0.467	18	0.682	6	0.332	21	0.613	2	<b>Low</b>
<b>Chiquimula</b>	0.447	19	0.22	20	0.579	5	0.457	8	<b>Very Low</b>
<b>Petén</b>	0.442	20	0.02	22	0.612	3	0.306	22	<b>Very Low</b>
<b>El Progreso</b>	0.36	21	0.257	19	0.421	16	0.598	4	<b>Very Low</b>
<b>Zacapa</b>	0.293	22	0.089	21	0.396	20	0.607	3	<b>Very Low</b>

## Comprehensive Disaster Management Assessment

Guatemala has all the key components for an effective CDM system. Legislation and authorities are in place to ensure CONRED and supporting agencies have the legal authority to make decisions regarding disaster events. Training opportunities exist to support the professionalization of the disaster management community, and a list of identified exercises aids staff members in practicing their training and assessing strengths and challenges. Guatemala has a national disaster management budget, which helps support disaster management activities throughout the country. Additionally, Guatemala has designated resources such as emergency operations centers (EOCs), warehouses with response supplies, and close partnerships with non-governmental organizations (NGOs) and the public and private sectors to fill in gaps as needed.

Guatemala has taken important steps towards establishing a framework to effectively prepare and respond to disasters. The results of these steps are reflected in the country's historical improvement in disaster management, even with the increase of urban centers making its population more susceptible to disasters. Being able to identify ways to overcome its challenges through collaborative partnerships has made CONRED and Guatemala stronger and more capable of maintaining an effective CDM system.

Results from the CDM analysis highlight key areas where disaster management capacity and capabilities could be strengthened, specifically, additional national funding and funding for departmental and municipal disaster organizations; strengthening of interagency partnerships; and the need for a formal training and exercise program (see Figure 3). Additional challenges identified the need to strengthen communication and information sharing; enhance equipment and resources, and utilize available technologies at all levels of response; and propagate the country's DRR laws and framework for better understanding and implementation.



Figure 3. Word Cloud of survey responses to: "In your opinion, what can your organization do to improve disaster response?"

## Recommendations

Detailed recommendations for DRR in Guatemala are included later in the document. Overarching themes include:

- *Strengthen data standards and sharing.* Ensure that hazard data and definitions are consistently defined among stakeholders, and promote data sharing among all disaster management organizations.
- *Develop and strengthen multi-stakeholder partnerships.* Partnerships include memorandums of agreement between neighboring communities and municipalities, involvement of the private sector in planning and response, cooperation across all levels of government with international government and non-governmental partners.
- *Institutionalize training and exercise programs.* Develop and document required courses for disaster management personnel. Implement an exercise program at all levels of disaster response, and establish a method to document exercises and lessons learned to effectively implement improvement plans.
- *Increase capacity for CONRED.* Explore partnerships to increase funding, providing for additional personnel, equipment, and stocked disaster warehouses throughout the country.
- *Expand availability of disaster plans.* Require all levels of government to complete disaster response plans, share those plans among stakeholders, and establish a minimum update period for the plans.
- *Increase accessibility to rural communities.* Provide disaster management educational material in multiple languages, improve the nationwide disaster-alert system, and develop programs to increase local and municipal capabilities and involvement in disaster response.



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# **Project Overview**

**National Disaster Preparedness Baseline Assessment  
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# Project Overview

This report summarizes the results of the National Disaster Preparedness Baseline Assessment (NDPBA) project conducted by the Pacific Disaster Center (PDC) in partnership with the Government of Guatemala. Designed to provide a comprehensive understanding of Guatemala's risk- and disaster management capabilities, the findings support evidence-based decision making to enhance disaster risk reduction (DRR) through focused capacity and capability building. Using a stakeholder-driven approach, the NDPBA project facilitated the integration of national DRR goals into the Risk and Vulnerability Assessment (RVA) and Comprehensive Disaster Management (CDM) methodologies.

The goal of the project was to enhance disaster resilience within Guatemala by:



## **Strengthening Governance**

Provides necessary justification to support policy decisions that will protect lives and reduce losses resulting from disasters.



## **Prioritizing Budgets and Investments**

Helps decision-makers identify, assess, and prioritize investments that will have the greatest impact on DRR.



## **Informing Decision Making**

Provides access to spatial and temporal information by multiple stakeholders including multi-hazard exposure, impact, and risk information all in one place.



## **Encouraging Cooperation**

Brings international, national, and local stakeholders together to discuss country goals, capacities, needs, and successes to help shape priorities.



## **Identifying Actions to Increase Resilience**

Helps stakeholders develop a five-year action plan to achieve risk-reduction goals and to enhance disaster mitigation, preparedness, response, and recovery.



## **Allowing Risk Monitoring and Data Management**

Multiple agencies can easily update data and monitor how risk and vulnerability changes over time at the national and subnational level.

The NDPBA project provides a repeatable and measurable approach to examining key elements of DRR. The NDPBA approach consists of distinct yet complimentary activities (see Figure 4), including:

- Focused stakeholder engagements;
- A detailed subnational Risk and Vulnerability Assessment (RVA) that includes the following elements: multi-hazard exposure, vulnerability, coping capacity, resilience, and multi-hazard risk;
- A review of national and subnational Comprehensive Disaster Management (CDM) capabilities to identify challenges and provide recommendations for strengthening preparedness and response;
- A proposed five-year plan including recommendations to build capacity and capability; and
- Data integration and information sharing.

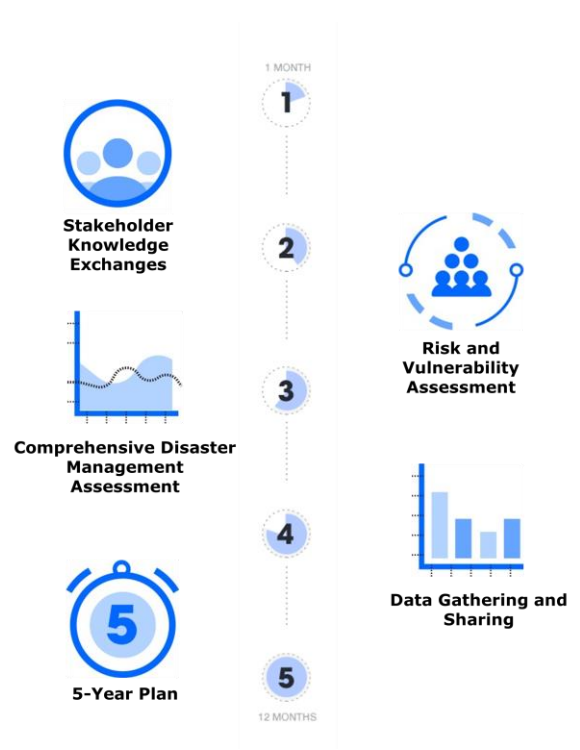


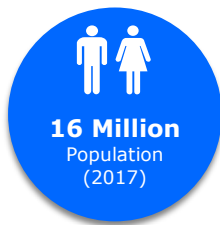
Figure 4. NDPBA activities

The data and final analysis provided in this report are integrated into the PDC's decision-support system known as DisasterAWARE™, allowing for open and free access to critical DRR data and information. Access to the system may be requested through [ndpba@pdc.org](mailto:ndpba@pdc.org).

## Country Background



Guatemala is the largest country in Central America, bordering Mexico to the north, El Salvador to the south, the Pacific Ocean to the west and a small Caribbean coastline between Belize and Honduras. Guatemala covers an area of 108,889 square kilometers (~42,000 square miles) with 400 kilometers (~249 miles) of coastline. The capital, Guatemala City, is the most populous city in the nation, with over 1 million residents within the city limits. Other highly populated cities include Mixco, Villa Nueva, Petapa, San Juan Sacatepéquez, and Quetzaltenango.<sup>1</sup>



The country is subdivided into 22 administrative departments, including: Alta Verapaz, Baja Verapaz, Chiquimula, Chimaltenango, El Progreso, Escuintla, Guatemala, Huehuetenango, Isabel, Jalapa, Jutiapa, Petén, Quetzaltenango, Quiché, Retalhuleu, Sacatepéquez, San Marcos, Santa Rosa, Sololá, Suchitepéquez, Totonicapán, and Zacapa. Guatemala's departments and autonomous regions are further subdivided into 339 municipalities.

There are three major geographic regions in Guatemala: The lowlands of the Petén region to the north, the highlands through the central and eastern part of the country, and the Pacific coast. Guatemala's 37 volcanoes, as well as most of the major cities, are all located in the highlands. The Petén region consists mainly of grasslands and tropical rainforests. The Pacific coast is made up of volcanic sand beaches and grassy lowlands.

Guatemala's geography makes it vulnerable to volcanic eruptions, floods, cyclones, landslides, and earthquakes. According to the *2016 Global Climate Risk Index*, Guatemala is tenth on the list of countries that have suffered the most disasters since 1995. The high number of disasters has continually stressed the government's

<sup>1</sup> World Atlas 2016. Accessed online 10/20/17 at: <http://www.worldatlas.com/na/gt/cities-in-guatemala.html>

ability to quickly and effectively respond. Poverty, economic hardships, and political upheaval have negatively impacted Guatemala's ability to prepare and recover from disasters. Funding for disaster preparedness and response is insufficient given the frequency and severity of natural disasters, and the country's National Disaster Management Organization (NDMO) and Coordinadora Nacional para la Reducción de Desastres (CONRED) consistently lack the manpower and resources for effective national response.

In 1996, *Ley y Reglamento 109-96* established CONRED as the nation's disaster-management organization. As the country and its approach to disasters have evolved, it was recognized that updates to the law are necessary for effective response and recovery. CONRED leadership, along with representatives from government, industry, and non-governmental organizations, are in the process of amending the law to allow for more flexibility in disaster response, including more emphasis on preparedness and mitigation actions.



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# Methods

**National Disaster Preparedness Baseline Assessment**  
Final Report



## Methods

This section of the report summarizes the NDPBA methodology implemented in Guatemala, to include stakeholder engagement, data-gathering procedures, data processing, and analysis.

### Facilitated Knowledge Exchanges

Facilitated stakeholder engagements acknowledge the Guiding Principles of the Sendai Framework for Disaster Risk Reduction and serve as a key component of the NDBPA. Over the duration of the project, stakeholders in Guatemala were invited to attend three Knowledge Exchanges (*Initial, Midterm, and Final*), as well as participate in data reviews, interviews, and standardized surveys. Knowledge Exchanges provided opportunities for stakeholders to present on disaster management topics of interest and highlight the important work each organization is undertaking to support DRR. Leveraging a participatory approach, a diverse group of traditional and non-traditional disaster management stakeholders were engaged. This encouraged active participation and promoted diversity among participants and partners.

Prior to the first Knowledge Exchange, in-depth archival research was conducted to gain insight into the national disaster management system and identify disaster management stakeholders who were subsequently invited to the Initial Knowledge Exchange. Presentations provided by the project team and by in-country stakeholders during this event and two subsequent Knowledge Exchanges provided opportunities to discuss the NDPBA methodology, explore available data sources and gaps, administer surveys, discuss disaster management challenges and successes, and review preliminary assessment results for Guatemala. Following the exchange, meetings with stakeholders were scheduled to conduct detailed interviews and share data and information. Additional stakeholder engagements provided opportunities to share data, conduct interviews, provide training on PDC's DisasterAWARE™ decision-support system, and exchange professional insights, experience, and best practices.

This participatory approach was coordinated with CONRED. Working closely with CONRED, the project team collaborated with a broad range of project stakeholders at national and subnational levels, including the Secretary for Planning and Programming (SEGEPLAN), National Institute of Statistics (INE), Guatemalan Red Cross, Universidad del Valle, the National Institute for Seismology, Volcanology, Meteorology and Hydrology (INSIVUMEH), and other government agencies; as well as the United Nations Country Team; and

national and international NGOs. A full list of participating agencies and organizations is included in the **Acknowledgements** section of this report.

## Risk and Vulnerability Assessment (RVA)

The purpose of conducting a subnational baseline Risk and Vulnerability Assessment (RVA) was to characterize elements of multi-hazard risk. The subnational NDBPA RVA was adapted from PDC’s established Global RVA framework to meet the specific needs of Guatemala. To capture the complex concept of risk, PDC’s RVA leverages a composite-index approach. Composite indices are constructed by combining data sets that represent general themes that contribute to risk (e.g., access to information, health status, or governance). These individual variables, or *indicators*, are uniform and quantifiable characteristics that reflect the overall concepts required for analysis. Appropriate subnational indicators were identified in partnership with stakeholders. The data were combined to represent the components of hazard exposure, vulnerability, and coping capacity.

### Multi-Hazard Exposure

Multi-Hazard Exposure is characterized by the people, property, systems, and other elements present in hazard zones that are thereby subject to potential losses. For this assessment, exposure considers five hazard types:



Cyclone

Areas exposed to tropical cyclone wind speeds that coincide with the Saffir-Simpson Scale, Category 1 or higher.



Earthquake

Areas with MMI VII and above based on 1.0-second spectral acceleration at a 2,475-year return period.



Volcano

Areas exposed to multiple specific volcanic hazards (including lava flow, pyroclastic flow, debris avalanche, edifice collapse, lahars, ash fall, ballistic bombs) for Pacaya, Santiaguito, Cerro Quemado, Fuego, Acatenango, Atitlan, and Agua volcanoes.



Flood

Areas susceptible to flood were estimated by CONRED using a combination of historical events and geospatial modeling. Susceptibility was classified on a relative scale. All flood areas ('low' to 'very high' susceptibility) were used to define the hazard zone.



Landslide

Areas susceptible to landslide were estimated by NASA-CATHALAC using environmental factors. Susceptibility was classified on a relative scale. Areas of 'very high', and 'high' susceptibility were used to define the hazard zone.

The Multi-Hazard Exposure Index is a function of both raw- and relative-population exposure. Raw-population exposure provides an indication of how many people are exposed, which can assist in planning and provide a better understanding of the raw scale of potential response activities needed, such as evacuation or sheltering. In contrast, relative-population exposure is

expressed as a proportion of base population. This provides an indication of how important a hazard is within a region, helping to facilitate prioritization in the decision-making process. Relative exposure also helps assess the relevance of hazards within regions that have relatively small populations.

## Vulnerability

Vulnerability can act to intensify hazard impacts, increasing overall risk. The Vulnerability Index was designed to capture the multi-dimensional nature of poverty, the inequality in access to resources due to gender, and the ability of a given area to adequately support the population. The dimensions of poverty measured are economic, health, living standards, and information access. Poverty is a major contributor to disaster vulnerability, however pressures based on demographic factors like population growth and environmental quality also affect vulnerability throughout the country. In Guatemala, Environmental Stress, Vulnerable Health Status, Clean Water Vulnerability, Access to Information Vulnerability, Economic Constraints, Gender Inequality, and Population Pressures are significant determinants of departmental vulnerability in areas with high Multi-Hazard Risk. The components of Vulnerability are defined here:



### **Environmental Stress**

Substantial water stress and land degradation can damage habitat and reduce quantity and quality of resources required to maintain human health and livelihoods. These stressors increase the likelihood and magnitude of hazards, such as flooding and landslides, while exacerbating impacts.



### **Vulnerable Health Status**

Reflects the population's general health. Poor health contributes to increased susceptibility to injury, disease, and stress associated with disasters and may necessitate special accommodations for activities such as evacuation.



### **Clean Water Vulnerability**

Represents the general state of water-related infrastructure. Poor distribution and containment systems contribute to reduced water quality and increase the potential for spread of disease.



### **Access to Information**

Represents the ability to access and comprehend hazard and disaster-related information before, during, and after an event.



### **Economic Constraints**

Represents the limitations on the resources available to invest in mitigation and preparedness measures at the individual, household, and country levels.



### **Gender Inequality**

Represents gender-based differences in access to resources, services, opportunities, and formal economic and political structures.



### **Population Pressures**

Refers to rapid, significant changes in the size and distribution of a population. Such changes tend to be difficult to plan for, and can destabilize social, economic, and environmental systems, placing additional stress on resources and infrastructure.

## **Coping Capacity**

In addition to high Multi-Hazard Exposure and high Vulnerability, Guatemala also demonstrates a reduced 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. The Coping Capacity of Guatemala is largely affected by constraints on governance, the economy and infrastructure. Economic Capacity and Infrastructure are the largest two drivers of Coping Capacity across departments. This indicates that departments are limited in their ability to absorb immediate economic losses and mobilize resources.

Unlike Multi-Hazard Exposure and Vulnerability, the Coping Capacity Index was calculated using a *weighted average* of the four subcomponents. Governance was weighted at 40%, Infrastructure at 30%, Economic Capacity at 20%, and Environmental Capacity at 10%, thereby placing less emphasis on the economic and environmental dimensions of coping capacity. The applied weighting serves a twofold purpose. First, and most importantly, it emphasizes the relative importance of each dimension's contribution to the concept of Coping Capacity. Second, it takes into consideration the quality of available data, and de-emphasizes those thematic areas where less and lower quality data are available. In the case of Coping Capacity, governance is determined to be a major driving factor, while the quantity and quality of environmental capacity data are generally limited.



### **Governance**

Reflects the stability and effectiveness of institutional structures to provide public services, freedom in selecting government, and enforcement of laws to prevent and control crime and violence. Instability of institutional structures can make a region more susceptible to the effects of hazard impacts.



### **Economic Capacity**

Represents a region's ability to absorb immediate economic losses and quickly mobilize financial assets for response and recovery activities.



### **Environmental Capacity**

Represents the ability of the environment to recover from a shock and maintain species health, biodiversity, and critical ecosystem services after impact. The environment can provide food/water and even tourism benefit.



### **Infrastructure Capacity**

Represents the resources that enable the exchange of information (Communications), physical distribution of goods and services to the population (Transportation and Health Care).



### **Health Care Capacity**

Represents availability of skilled caregivers and facilities, whether populations have access to vital resources before, during, and after a hazard event.



### **Communications Capacity**

Represents the density and variety of communications infrastructure available to support coordinated action among local, national, and international actors.



### **Transportation Capacity**

Denser transportation networks provide more options for bringing outside resources into a country (ports and airports) and increase the likelihood of alternate routes for reaching impacted populations.

## **Lack of Resilience**

The Lack of Resilience Index represents the combination of susceptibility to impact and the relative inability to absorb, respond to, and recover from negative impacts that occur over the short term. The Lack of Resilience provides an indication of current socioeconomic conditions on the ground

independent of hazard exposure. These data can be used during hazard events to prioritize response efforts. The basic model for Lack of Resilience Index is:

$$\text{Lack of Resilience} = \text{Vulnerability} + (1 - \text{Coping Capacity}) / 2$$

## Multi-Hazard Risk



### Multi-Hazard Risk (MHR)

The combination of Multi-Hazard Exposure, susceptibility to impact (Vulnerability), and the relative ability to absorb, respond to, and recover from negative impacts that occur over the short term (Coping Capacity).



### Multi-Hazard Exposure (MHE)

People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.



### Vulnerability (V)

The characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard.



### Coping Capacity (CC)

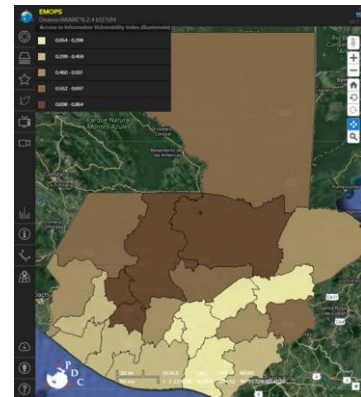
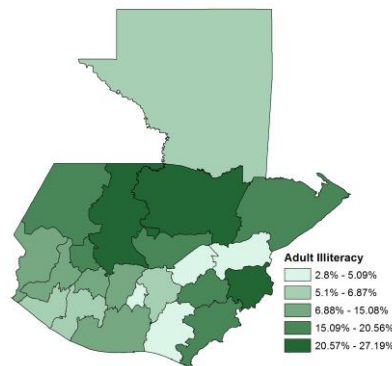
The ability of people, organizations, and systems, using available skills and resources, to face and manage adverse conditions, emergencies, or disasters.

The basic model for the Multi-Hazard Risk Index is:

$$\text{Multi-Hazard Risk} = \left[ \text{Multi-hazard Exposure} + \text{Vulnerability} + (1 - \text{Coping Capacity}) \right] / 3$$



## Methodological Process



### Data Gathering

- Online/Archival research
- Stakeholder interviews

### Data Processing & Analysis

- Indicator development
- Index construction

### RVA Findings

- Reporting and dissemination
- DisasterAWARE™ data integration

Figure 5. NDPBA Risk and Vulnerability Assessment (RVA) methodological process

### Data Gathering

In partnership with stakeholders, a review of archival research and stakeholder interviews were conducted to identify potential data to be included in the study. Each indicator was gathered from vetted sources, and evaluated for potential use in the RVA model. Data were scrutinized to identify possible gaps, missing values, and to document any caveats regarding data quality or completeness. In certain cases, missing documentation or lack of data lineage precluded the use of datasets in the analysis. For details on the RVA data sets used in this analysis see **Appendix A: RVA Component Index Hierarchies and Thematic Rationale**.

### Data Processing and Analysis

Datasets used in the analysis were standardized for use as indicators to make meaningful comparisons. For details on RVA index construction Appendix B: RVA Index Construction.

### RVA Findings

The results of the analysis helped to identify potential areas in which to focus limited resources to reduce disaster risk. As part of the final report, programmatic recommendations at the national level and specific strategies to reduce vulnerabilities and increase coping capacities at the subnational level are provided. The analyzed data have been integrated into PDC's DisasterAWARE™.

Recommendations are a product of the Guatemala Risk and Vulnerability Assessment, both as a process and a result. These overarching recommendations are designed to acknowledge the complex drivers of risk that are prevalent throughout the country, and support future assessments and sustainable disaster- risk reductions initiatives. As presented in the previous section, the specific drivers of risk can vary widely across departments. Consequently, to focus interventions that reduce vulnerability and increase coping capacity at the department level, decision-makers must carefully examine these drivers for each department.

## Comprehensive Disaster Management (CDM)

Comprehensive Disaster Management (CDM) is the integrated approach of managing hazards through all phases of disaster management. Leveraging the latest academic research, the CDM analysis examines core elements of effective disaster management. The assessment is constructed to provide a systematic understanding of the challenges to operationalizing disaster-management techniques in support of diverse community needs. The results of the assessment provide necessary information for policy makers to effectively direct investments to save lives and reduce losses. The CDM assessment can provide greater context to the RVA by placing the risk of each department into the larger DRR framework of Guatemala.

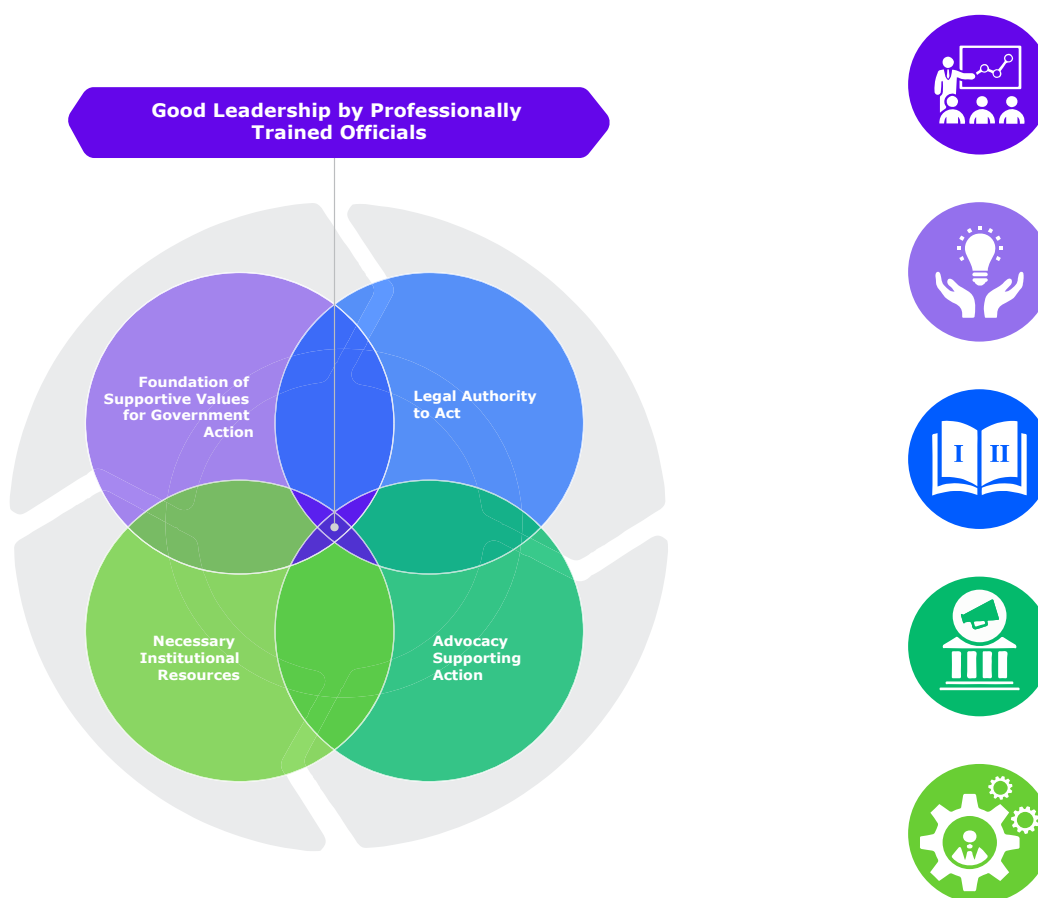


Figure 6. Comprehensive Disaster Management elements

For the purposes of this assessment, CDM is conceptualized as a function of five elements (see Figure 6):



### **Good Leadership by Professionally Trained Officials**

The basis of successful disaster management centers upon the importance of well-trained professionals. A community or country that has established professionalization of the disaster management field through formalized training and education programs is ensuring a foundation of understanding and leadership among disaster management personnel at all levels. Training and exercises also offer opportunities to build leadership capacity in the disaster management field, increasing the professionalization of the field.



### **Foundation of Supportive Values for Government Action**

A foundation of supportive values for government action is an essential component, which enables concepts to be developed into policies and provides government leaders the backing to spend money to obtain necessary resources. This is critical for communities and countries with a limited economic base. Disaster preparedness is only one of many issues a government may face. Government support must be encouraged to ensure that the proper importance is placed on disaster management mitigation and preparedness in an effort to build disaster resilient communities with a focus on saving lives and reducing disaster losses.



### **Legal Authority to Act**

Legal authority to act provides the necessary foundation for implementation of CDM. The legal framework within which disaster operations occur has a significant impact on preparedness, response, recovery, and mitigation. Without the authority to act and the support of government officials, CDM activities can be halted, leaving residents vulnerable to disasters.



### **Advocacy Supporting Action**

Ensures that disaster management policies are implemented nationwide. The backing of political leaders is not always enough to ensure that hazard policies are implemented. Successful disaster management requires strong stakeholder support across all levels. Following a disaster, stakeholder support for action is generally high and may play a key role in hazard-policy implementation. Stakeholders include traditional and non-traditional partners involving the general public, non-governmental organizations, academic institutions, the private

sector, and those providing assistance before, during, and after a disaster.

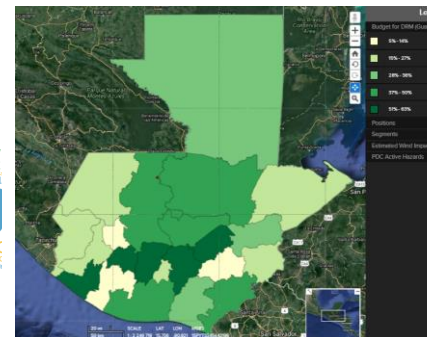


### Necessary Institutional Resources

It is critical that every jurisdiction has an accurate assessment of available resources (human and material) and the availability of those resources during a disaster. Although a jurisdiction may have a limited economic base and few immediate resources, through mutual-aid agreements with neighboring jurisdictions, resources can be easily mobilized to respond. Being able to quickly assess the community needs and having the knowledge of available resources, aid can be requested in a timely manner to ensure immediate emergency needs are met.

## Methodological Process

The methodological process for the NDPBA CDM is illustrated below in Figure 7. CDM data were analyzed using a mixed-methods approach. The approach combined both qualitative and quantitative data and methods of analysis, allowing for a more complete assessment of the CDM theoretical framework.



#### Data Gathering

- Archival research
- 157 surveys
- 42 interviews
- 15 site visits

#### Data Processing & Analysis

- Quantitative and qualitative analysis of data inputs

#### CDM Findings

- Final report documents successes and areas for CDM enhancement
- DisasterAWARE™ data integration

Figure 7. NDPBA Comprehensive Disaster Management (CDM) methodological process

### Data Gathering

Archival research, surveys, and interviews were the primary data-gathering methods used to gain insight into existing capabilities of Guatemala’s disaster-management structure. Interviews with stakeholders corroborated information obtained through online research and from surveys administered

during Knowledge Exchange workshops. All information collected was put in context using elements of the CDM framework as a guide. Figure 8 illustrates the types of information gathered and analyzed for each component of the CDM analysis.

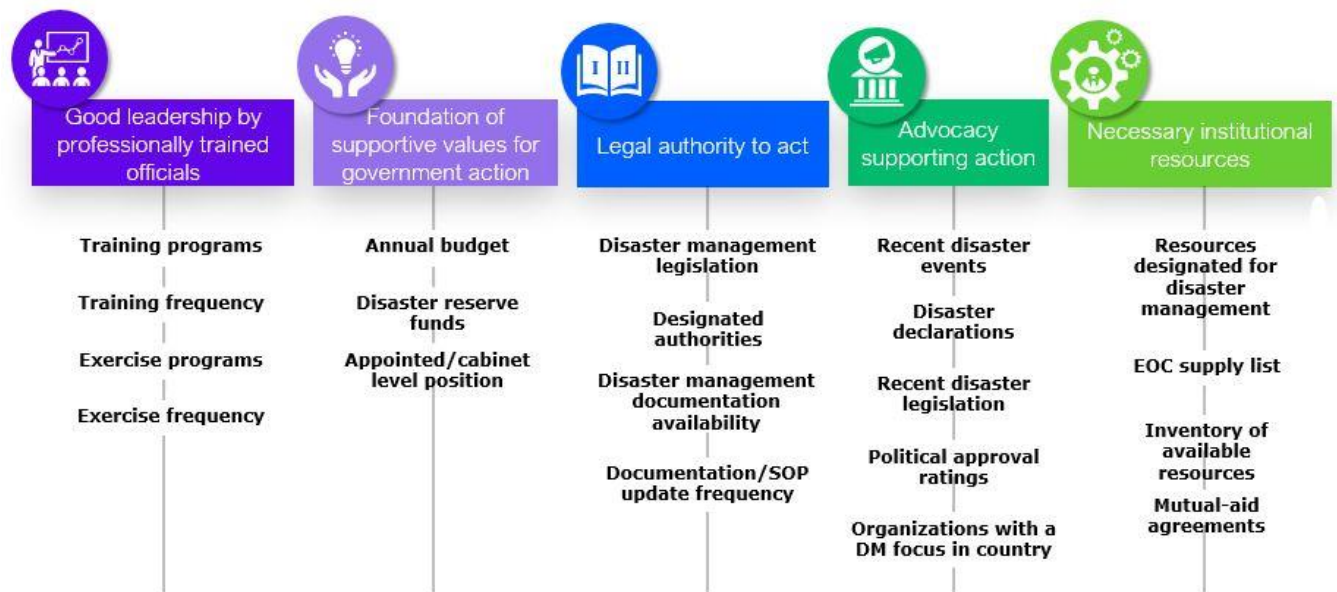


Figure 8. Datasets for CDM analysis

### Data Processing and Analysis

Three CDM surveys were administered over the course of the project, with emphasis on questions related to disaster preparedness and response activities. Survey responses were analyzed either quantitatively or qualitatively, depending upon the question. Summary statistics and frequencies were generated for ranked-response questions. Open-ended questions helped to identify recurring themes that could be further explored during interviews with disaster management stakeholders. Survey responses are discussed in **Appendices C, D, and E**.

### CDM Findings

CDM results helped to identify existing strengths and potential challenges that limit the delivery of effective disaster management. As part of this report, programmatic recommendations are provided to strengthen preparedness and response capacities, and thereby safeguard lives and reduce disaster losses.

**Better solutions.  
Fewer disasters.  
Safer world.**

A scenic landscape photograph showing a large, conical volcano in the background under a blue sky with light clouds. In the foreground, a calm lake reflects the surrounding greenery and the volcano. The shoreline is lined with lush tropical vegetation, including various trees and flowering plants.

# **Findings: National**

**National Disaster Preparedness Baseline Assessment**  
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## Risk and Vulnerability Assessment (RVA)

Based on PDC's Global Risk and Vulnerability Assessment (RVA), Guatemala has the highest overall multi-hazard risk within the Central American Region. Guatemala's risk is driven by high multi-hazard exposure and high socioeconomic vulnerability coupled with a limited coping capacity.

The subnational risk assessment describes how these factors of multi-hazard risk are distributed across departments in Guatemala. The RVA results presented in this section represent the analysis of the 22 departments in Guatemala. The RVA results highlight regions of Guatemala that may be in greater need of support due to increased population exposure, higher vulnerability, or lower coping capacity. The RVA helps to:



### **Identify Disaster Risk Reduction Priorities**

Helps stakeholders develop a five-year action plan to achieve risk reduction goals and to enhance disaster mitigation, preparedness, response, and recovery.



### **Assess Drivers of Risk**

Allows examination from index to dataset level, identifying the level of exposure in an area to multiple hazards, the aspects of population that make them susceptible to hazard impact, and areas that can be improved to support coping strategies following hazard events.



### **Provide a Baseline for Resource Distribution**

Identify areas that may need additional support before, after, and during hazard events.

Table 3 provides a summary of the component results for Multi-Hazard Risk (MHR), Multi-Hazard Exposure (MHE), Vulnerability (V), Coping Capacity (CC), including index scores, and relative ranking among the 22 departments. A rank of 1 corresponds to a high score (e.g., high multi-hazard risk), while a rank of 22 indicates a low score (e.g., low multi-hazard risk).

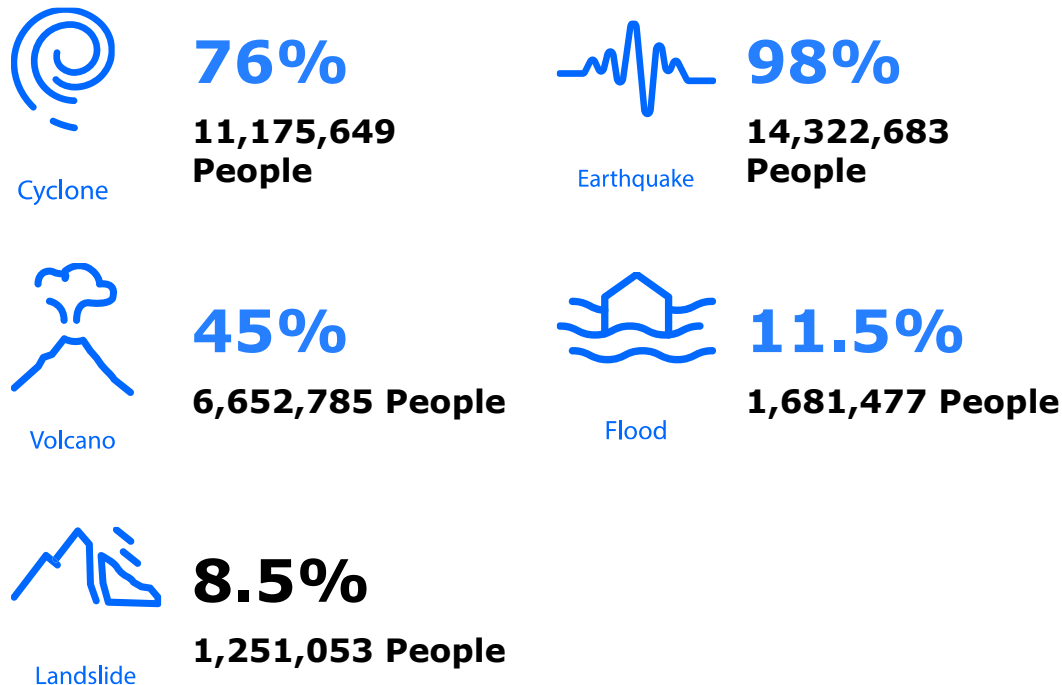
Table 3. Multi-Hazard Risk (MHR) Index scores and component indices

Department	Multi-Hazard Risk		Multi-Hazard Exposure		Vulnerability		Coping Capacity		Department Risk Level
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
<b>Quiché</b>	0.632	1	0.621	9	0.587	4	0.311	20	<b>Very High</b>
<b>Totonicapán</b>	0.629	2	0.684	5	0.64	2	0.438	11	<b>Very High</b>
<b>Chimaltenango</b>	0.586	3	0.722	2	0.441	13	0.405	14	<b>Very High</b>
<b>Alta Verapaz</b>	0.583	4	0.353	18	0.707	1	0.311	21	<b>Very High</b>
<b>San Marcos</b>	0.576	5	0.598	10	0.519	8	0.389	18	<b>High</b>
<b>Escuintla</b>	0.563	6	0.674	7	0.412	17	0.397	16	<b>High</b>
<b>Sololá</b>	0.56	7	0.709	3	0.488	10	0.515	6	<b>High</b>
<b>Guatemala</b>	0.557	8	0.913	1	0.3	22	0.541	5	<b>High</b>
<b>Retalhuleu</b>	0.546	9	0.643	8	0.411	18	0.418	12	<b>High</b>
<b>Huehuetenango</b>	0.541	10	0.471	12	0.466	11	0.316	19	<b>Moderate</b>
<b>Suchitepéquez</b>	0.539	11	0.58	11	0.434	15	0.397	15	<b>Moderate</b>
<b>Jalapa</b>	0.523	12	0.392	17	0.572	6	0.396	17	<b>Moderate</b>
<b>Jutiapa</b>	0.513	13	0.462	13	0.529	7	0.453	9	<b>Moderate</b>
<b>Quetzaltenango</b>	0.505	14	0.694	4	0.44	14	0.619	1	<b>Low</b>
<b>Izabal</b>	0.47	15	0.407	16	0.441	12	0.439	10	<b>Low</b>
<b>Santa Rosa</b>	0.469	16	0.425	14	0.397	19	0.414	13	<b>Low</b>
<b>Baja Verapaz</b>	0.469	17	0.413	15	0.5	9	0.507	7	<b>Low</b>
<b>Sacatepéquez</b>	0.467	18	0.682	6	0.332	21	0.613	2	<b>Low</b>
<b>Chiquimula</b>	0.447	19	0.22	20	0.579	5	0.457	8	<b>Very Low</b>
<b>Petén</b>	0.442	20	0.02	22	0.612	3	0.306	22	<b>Very Low</b>
<b>El Progreso</b>	0.36	21	0.257	19	0.421	16	0.598	4	<b>Very Low</b>
<b>Zacapa</b>	0.293	22	0.089	21	0.396	20	0.607	3	<b>Very Low</b>

## Multi-Hazard Exposure

The population in Guatemala experiences very high levels of exposure to seismic activity and tropical cyclone winds. Over 98% of the population are exposed to seismic activity and over 75% of the population are exposed to tropical cyclone activity. Smaller proportions of the population are also exposed to volcanic activity, flooding, and landslides.

Table 4. Population exposure to hazards in Guatemala



Examining hazard exposure data for each hazard type provides a cross-section that can be used to identify the specific hazards contributing to exposure in each department. Understanding exposure to specific hazards is valuable for determining appropriate mitigation actions. Differences in the type of hazard inherently dictate which mitigation options could be most effective in reducing losses and casualties in Guatemala. For example, mitigation efforts in Izabal aimed at reducing the impacts of flooding would be ineffective preventing losses from volcanic activity in Sololá. This assessment demonstrates the importance of understanding hazard exposure not only in terms of the total number of people exposed, but also

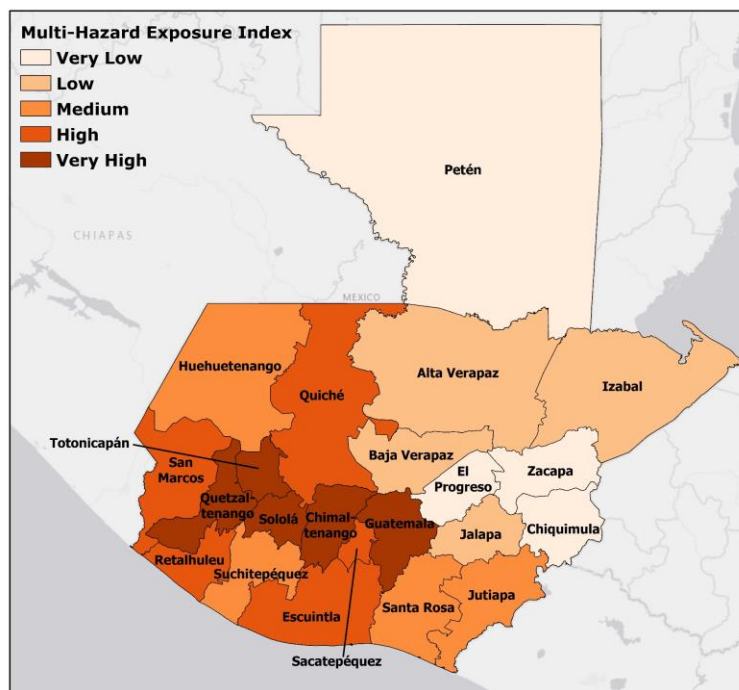


Figure 9. Distribution of Multi-Hazard Exposure Index scores across departments with relative ranking of each department by Multi-Hazard Exposure score

the hazards that threaten them (Figure 9).

## Vulnerability

Guatemala has the highest socioeconomic vulnerability in the Central American region. Vulnerability to disasters in Guatemala is largely driven by the dimensions of poverty. As of 2014, over 62% of the population was living in poverty. This indicates that the population of Guatemala lacks adequate resources to invest in mitigation and preparedness at the individual and household levels. This results in reliance on departmental and central-government preparedness efforts to prevent disasters.

Existing vulnerabilities can act to intensify hazard impacts, increasing overall risk. Economic Constraints and Access to Information Vulnerability are the largest determinants of a department's vulnerability for those with the highest multi-hazard risk. The Economic Constraints component was conceptualized to represent the limitations on the resources available to invest in mitigation and preparedness measures at the individual, household, and country levels. Access to Information Vulnerability was constructed to represent the ability to access and comprehend hazard and disaster-related information before, during and after an event.

Areas with higher Vulnerability Index scores are more susceptible to harm from hazards, often lacking the resources to adequately implement preparedness or mitigation measures. Recognizing the sensitivities of vulnerable areas, the Vulnerability Index (illustrated in Figure 10) is an instrument for decision support in comparing and prioritizing disaster- mitigation projects and allocating aid following hazard events.

Table 5. Vulnerability scores and ranks in Guatemala

Department	Vulnerability	
	Score	Rank
<b>Alta Verapaz</b>	0.707	1
<b>Totonicapán</b>	0.640	2
<b>Petén</b>	0.612	3
<b>Quiché</b>	0.587	4
<b>Chiquimula</b>	0.579	5
<b>Jalapa</b>	0.572	6
<b>Jutiapa</b>	0.529	7
<b>San Marcos</b>	0.519	8
<b>Baja Verapaz</b>	0.500	9
<b>Sololá</b>	0.488	10
<b>Huehuetenango</b>	0.466	11
<b>Izabal</b>	0.441	12
<b>Chimaltenango</b>	0.441	13
<b>Quetzaltenango</b>	0.440	14
<b>Suchitepéquez</b>	0.434	15
<b>El Progreso</b>	0.421	16
<b>Escuintla</b>	0.412	17
<b>Retalhuleu</b>	0.411	18
<b>Santa Rosa</b>	0.397	19
<b>Zacapa</b>	0.396	20
<b>Sacatepéquez</b>	0.332	21
<b>Guatemala</b>	0.300	22

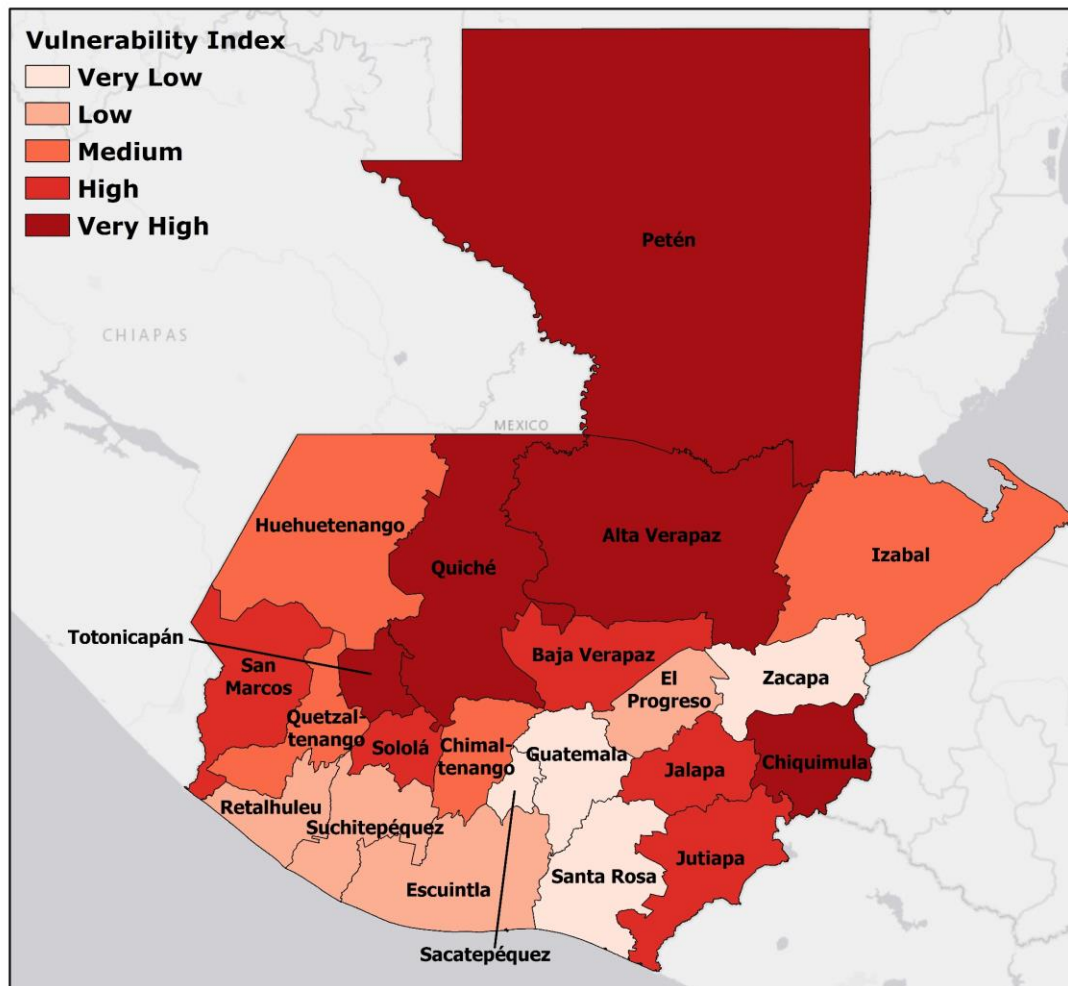


Figure 10. Distribution of Vulnerability Index scores across departments and relative ranking of each department by Vulnerability score

### Vulnerability: Case Study

Examining the subcomponents of the Vulnerability Index can highlight the drivers of vulnerability within departments. In context, these sensitivities translate to increased susceptibility to hazard impacts, because of limited economic resources; inability to access and comprehend vital emergency information; compromised water and sanitation services; rapid changes in urban population; disparities in health and health-care access; and gender-based differences in access to resources, services, and opportunities. The following chart examines the specific drivers of vulnerability in the three most vulnerable departments.



### Alta Verapaz – Highest Vulnerability (1 of 22 Departments)



**Information Access Vulnerability**

Very High (Rank: 1 of 22)



**Clean Water Vulnerability**

Very High (Rank: 1 of 22)



**Population Pressure**

Very High (Rank: 1 of 22)

Investments in infrastructure, especially telecommunications and water, will increase the population’s ability to respond to and recover from disaster, reducing vulnerability.



### Totonicapán – 2<sup>nd</sup> Highest Vulnerability (2 of 22 Departments)



**Information Access Vulnerability**

Very High (Rank: 3 of 17)



**Population Pressures**

Very High (Rank: 3 of 17)



**Economic Constraints**

Very High (Rank: 4 of 17)

Investment in communication infrastructure – such as cell towers, internet, and television – will provide access to disaster information and education.



### Petén – 3<sup>rd</sup> Highest Vulnerability (3 of 22 Departments)



**Population Pressures**

Very High (Rank: 2 of 22)



**Clean Water Vulnerability**

Very High (Rank: 3 of 22)



**Gender Inequality**

Very High (Rank: 4 of 22)

Investments in water and sewer infrastructure, and focus on policies to control/support population changes, will decrease the department’s vulnerability in the event of a disaster.

While the factors of vulnerability are inextricably linked, a single intervention may not reduce all components of vulnerability in all departments. In Alta Verapaz, 98% of households do not have internet access, and less than 50% have access to cable television. Therefore, interventions that increase the accessibility of information would most certainly serve to reduce overall Vulnerability. In contrast, information-access vulnerability is lower in Petén, but the department ranks higher on dimensions of gender inequality. Subsequently, interventions aimed at reducing overall vulnerability in Petén should consider issues of gender-based access to resources to have the greatest impact. This illustrates the utility of the Vulnerability Index in guiding resource allocation, and highlights the importance of a thorough examination

of all dimensions of vulnerability to inform decision making at the subnational level.

## Coping Capacity

By analyzing the different subcomponents of the Coping Capacity Index, it becomes possible to identify distinct factors that drive a population's or organization's difficulty to cope with hazards. The examination of the subcomponents of coping capacity reveals that Petén is the department with the lowest coping capacity in Guatemala (ranked 22 of 22; see Table 6). The low coping capacity is driven primarily by very low governance and very low infrastructure. Huehuetenango's (ranked 21 of 22) low capacity is primarily driven by poor economic capacity. Alta Verapaz (ranked 20 of 22) has the lowest infrastructure ranking and the third lowest economic-capacity ranking. See Figure 11 for Coping Capacity Index scores across departments.

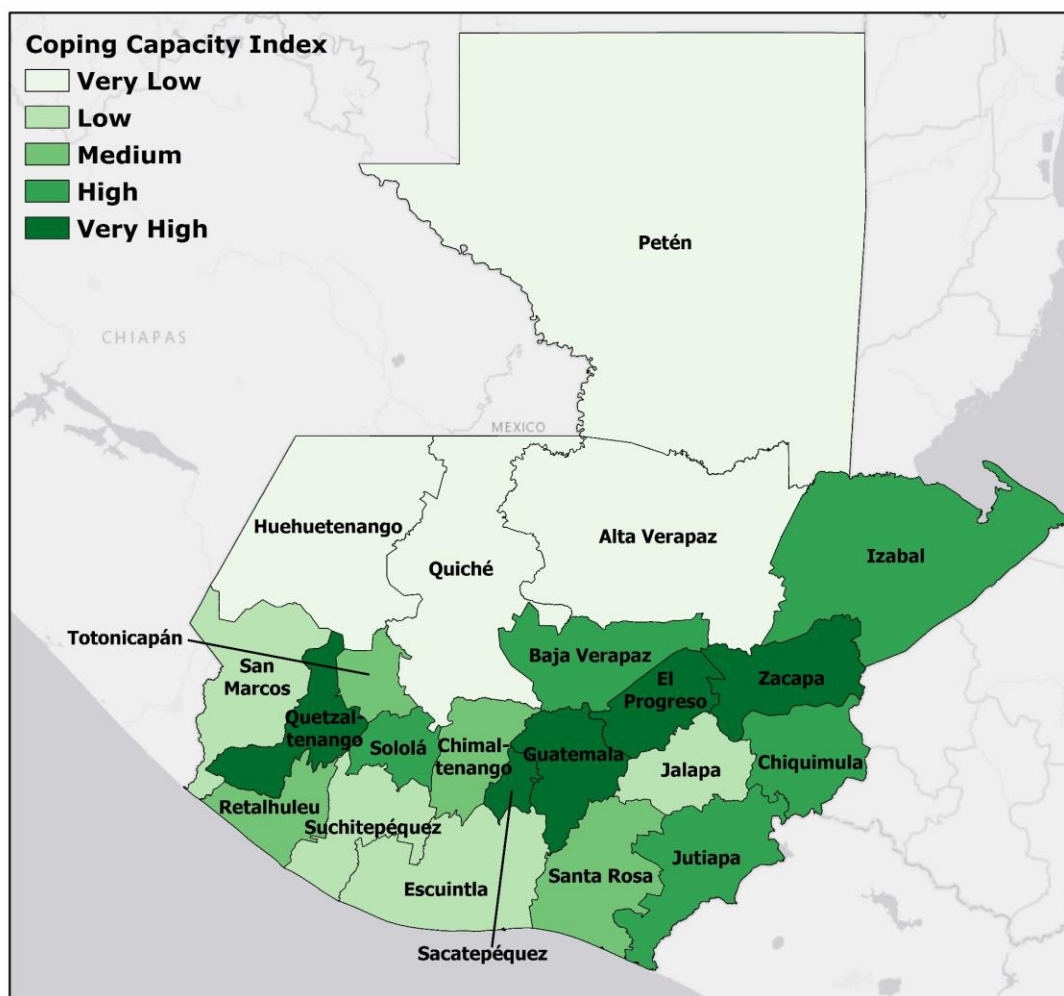


Figure 11. Distribution of Coping Capacity Index scores across departments and relative ranking of each department by Coping Capacity score

Table 6. Coping Capacity scores and ranks in Guatemala

Department	Coping Capacity	
	Score	Rank
<b>Quetzaltenango</b>	0.619	1
<b>Sacatepéquez</b>	0.613	2
<b>Zacapa</b>	0.607	3
<b>El Progreso</b>	0.598	4
<b>Guatemala</b>	0.541	5
<b>Sololá</b>	0.515	6
<b>Baja Verapaz</b>	0.507	7
<b>Chiquimula</b>	0.457	8
<b>Jutiapa</b>	0.453	9
<b>Izabal</b>	0.439	10
<b>Totonicapán</b>	0.438	11
<b>Retalhuleu</b>	0.418	12
<b>Santa Rosa</b>	0.414	13
<b>Chimaltenango</b>	0.405	14
<b>Suchitepéquez</b>	0.397	15
<b>Escuintla</b>	0.397	16
<b>Jalapa</b>	0.396	17
<b>San Marcos</b>	0.389	18
<b>Huehuetenango</b>	0.316	19
<b>Quiché</b>	0.311	20
<b>Alta Verapaz</b>	0.311	21
<b>Petén</b>	0.306	22

Weaker governance may lead to a range of problems in the management of hazards including reduced public safety and ineffective disaster planning. Additional support for local police, firefighters, and emergency medical resources may improve public safety, both in normal conditions and during an emergency. Similarly, lower Infrastructure scores can indicate a reduction in the exchange of information, and reduced access to vital resources and health services. Example interventions could include fostering national campaigns to improve equity of infrastructure in rural areas, ensuring connectivity to critical services and resources.

Limited economic capacity means these areas may not have financial assets, savings, or reserves to absorb immediate economic impacts, mobilize response and recovery services, or aid in disaster relief. In

departments with low economic capacity, disaster-management practitioners can leverage mutual-aid agreements and non-traditional partnerships to support disaster preparedness, response, and relief initiatives.



## Lack of Resilience

The Lack of Resilience Index (mapped in Figure 12) represents the combination of Vulnerability and Coping Capacity. The graduation from two separate components to the larger overarching concept of resilience demonstrates the hierarchical approach of PDC's RVA, whereby results are built upwards to develop indices that have distinct implications for disaster risk reduction. Furthermore, as Vulnerability and Coping Capacity are measured independent of the hazard, disaster managers can overlay the Lack of Resilience Index with real-time hazard data to estimate risk on a per-event basis as new threats occur. Table 7 summarizes the results of the Lack of Resilience Index for Guatemala.

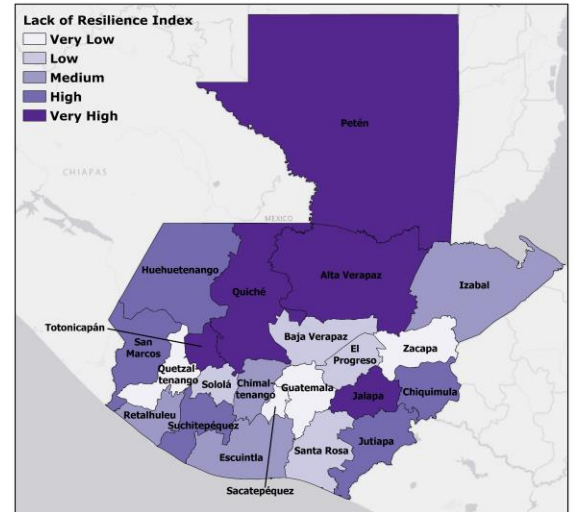


Figure 12. Distribution of Lack of Resilience Index scores across department and relative ranking of each department by Lack of Resilience score

Table 7. Guatemala Lack of Resilience (LR) Index scores and rankings by department

Department	Lack of Resilience		Vulnerability		Coping Capacity		Department Lack of Resilience
	Score	Rank	Score	Rank	Score	Rank	
<b>Alta Verapaz</b>	0.698	1	0.707	1	0.311	21	<b>Very High</b>
<b>Petén</b>	0.653	2	0.612	3	0.306	22	<b>Very High</b>
<b>Quiché</b>	0.638	3	0.587	4	0.311	20	<b>Very High</b>
<b>Totonicapán</b>	0.601	4	0.64	2	0.438	11	<b>Very High</b>
<b>Jalapa</b>	0.588	5	0.572	6	0.396	17	<b>Very High</b>
<b>Huehuetenango</b>	0.575	6	0.466	11	0.316	19	<b>High</b>
<b>San Marcos</b>	0.565	7	0.519	8	0.389	18	<b>High</b>
<b>Chiquimula</b>	0.561	8	0.579	5	0.457	8	<b>High</b>
<b>Jutiapa</b>	0.538	9	0.529	7	0.453	9	<b>High</b>
<b>Suchitepéquez</b>	0.519	10	0.434	15	0.397	15	<b>Moderate</b>
<b>Chimaltenango</b>	0.518	11	0.441	13	0.405	14	<b>Moderate</b>
<b>Escuintla</b>	0.508	12	0.412	17	0.397	16	<b>Moderate</b>
<b>Izabal</b>	0.501	13	0.441	12	0.439	10	<b>Moderate</b>
<b>Retalhuleu</b>	0.497	14	0.411	18	0.418	12	<b>Low</b>
<b>Baja Verapaz</b>	0.497	15	0.5	9	0.507	7	<b>Low</b>
<b>Santa Rosa</b>	0.492	16	0.397	19	0.414	13	<b>Low</b>
<b>Sololá</b>	0.486	17	0.488	10	0.515	6	<b>Low</b>
<b>El Progreso</b>	0.411	18	0.421	16	0.598	4	<b>Very Low</b>
<b>Quetzaltenango</b>	0.41	19	0.44	14	0.619	1	<b>Very Low</b>
<b>Zacapa</b>	0.395	20	0.396	20	0.607	3	<b>Very Low</b>
<b>Guatemala</b>	0.379	21	0.3	22	0.541	5	<b>Very Low</b>
<b>Sacatepéquez</b>	0.359	22	0.332	21	0.613	2	<b>Very Low</b>

## Multi-Hazard Risk

The Multi-Hazard Risk Index (mapped in Figure 13) provides a high-level tool that supports comparison of risk across Guatemala. Though the MHR Index provides a powerful overview of risk conditions, its component indices – Multi-Hazard Exposure, Vulnerability, and Coping Capacity – and their subcomponents provide crucial details on the drivers of risk. These drivers can be used to design focused interventions for overall disaster risk reduction at the department level.

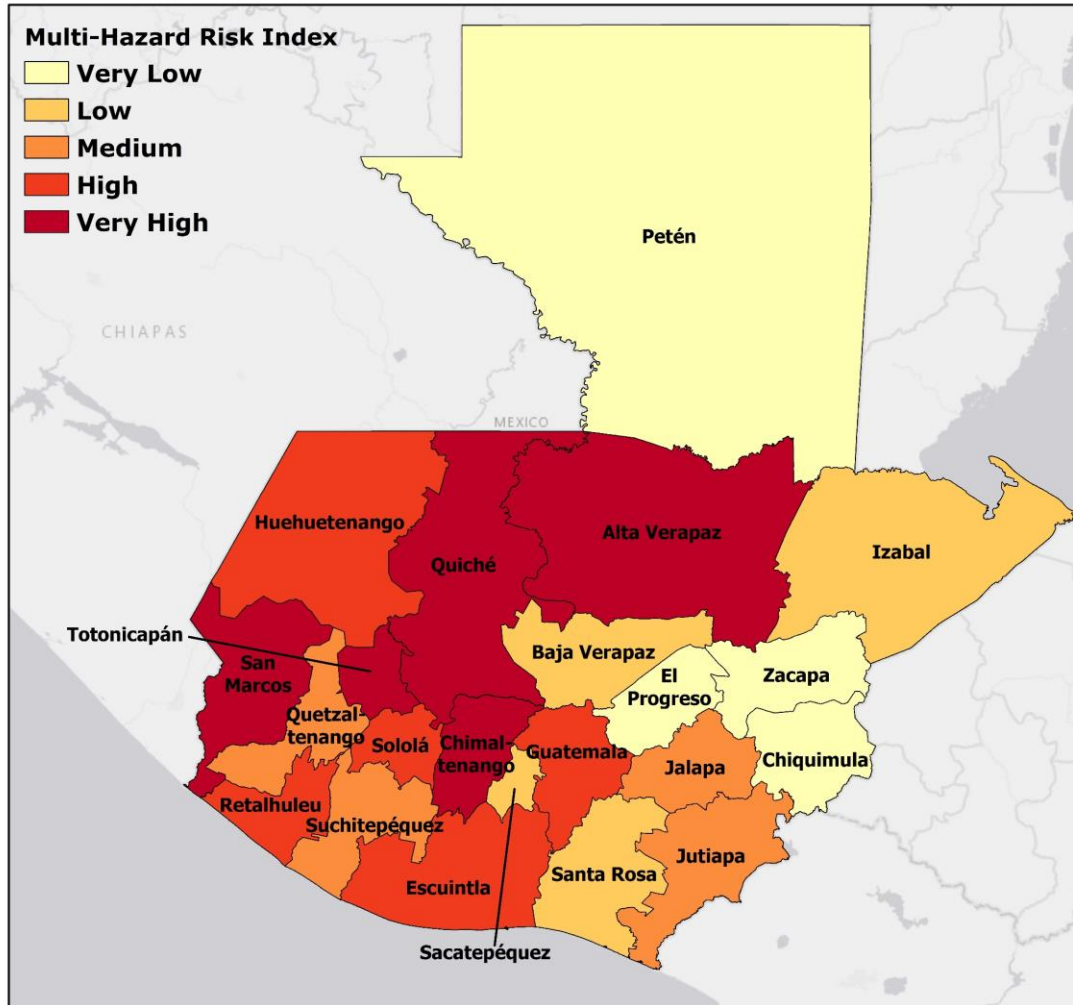


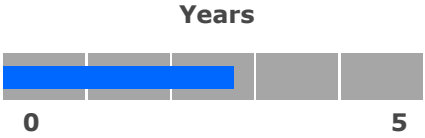
Figure 13. Distribution of Multi-Hazard Risk Index scores across departments and relative ranking of each department by MHR score



# Programmatic Recommendations

These programmatic recommendations are designed to acknowledge the complex drivers of risk that are prevalent throughout the country and support future assessments and sustainable disaster risk-reductions initiatives. Specific department-level recommendations are provided in each department profile. To focus interventions that reduce vulnerability and increase coping capacity at the department level, decision-makers must carefully examine these drivers for each department.

Table 8. Recommendations Evaluation Criteria

<b>Recommendations Evaluation Criteria</b>		
<b>Effort</b>	 <p style="text-align: center;">Years 0 5</p>	Estimated length of time (in years) to complete the project once it is started.
<b>Complexity</b>	<p style="text-align: center;">Low <b>Medium</b> High</p>	Overall complexity based on the estimated staff time, resources, and collaboration required to complete the project.
<b>Cost</b>	<p><b>\$\$\$</b></p>	<p>Estimated annual cost of the project, not including salaries, based on a percentage of the current NDMO annual budget.</p> <p>\$ approximates less than 1% of the annual operating budget.</p> <p>\$ \$ approximates between 1% to 10% of annual operating budget.</p> <p>\$ \$ \$ approximates more than 10% of the annual operating budget.</p>

## 01

### Strengthen data standards and sharing

- A. Ensure that hazards and vulnerability data are consistently defined, documented, updated, and applied in disaster-management and disaster-risk reduction.
- B. Implement strategies to strengthen data sharing and transparency among all organizations active in disaster management to support evidence-based decision making.



**Complexity:** Medium

**Cost:** \$

02

**Develop and strengthen multi-stakeholder partnerships**

- A. Increase the capacity to conduct and update high-resolution hazard assessments with national coverage by developing partnerships with non-traditional stakeholders.
- B. Strengthen strategic multi-stakeholder partnerships to expand disaster risk-reduction resources to include non-traditional disaster management partners.



**Complexity:** Low

**Cost:** \$

# Comprehensive Disaster Management (CDM)

CDM assessment results highlight aspects of disaster management that may help address issues associated with increased exposure to natural hazards, higher socioeconomic vulnerability, or lower coping capacity. Overall, the CDM assessment helps to:



**Identify Disaster Management Capabilities**

Provides a contextual overview of disaster management capabilities and identifies the strengths and challenges of Guatemala’s disaster management system.



**Provide Context to RVA Results**

Provides context to the RVA results previously discussed by highlighting the larger DRR framework in Guatemala.

Successes, challenges, and their implications for the overall effectiveness of Guatemala’s disaster management system are outlined in detail in the following sections based on the five key elements assessed. Recommendations are provided for each CDM element to assist in strengthening disaster management capacities in-country. See Table 9 for the evaluation criteria of CDM recommendations.

*Table 9. Recommendations Evaluation Criteria*

<b>Recommendations Evaluation Criteria</b>		
<b>Effort</b>	<p style="text-align: center;">Years</p> <p style="text-align: center;">0 <span style="margin-left: 100px;">5</span></p>	Estimated length of time (in years) to complete the project once it is started.
<b>Complexity</b>	<p style="text-align: center;">Low    <b>Medium</b>    High</p>	Overall complexity based on the estimated staff time, resources, and collaboration required to complete the project.
<b>Cost</b>	<p><b>\$\$\$</b></p>	<p>Estimated annual cost of the project, not including salaries, based on a percentage of the current NDMO annual budget.</p> <p>\$ approximates less than 1% of the annual operating budget.</p> <p>\$\$ approximates between 1% to 10% of annual operating budget.</p> <p>\$\$\$ approximates more than 10% of the annual operating budget.</p>





## Good Leadership by Professionally Trained Officials

Survey results provide a positive view of training and exercises, although challenges are present. Budgetary shortfalls for DRR activities prevent the full implementation of training and exercises at each level of government

*Surveys indicate there is a positive view of disaster management leadership.*

- 67% of stakeholders were in a position of leadership within their organizations.
- 65% of respondents reported that their organizations have strong disaster management leadership, and
- 51% felt that their organizations had effective disaster management programs.

limiting the ability to effectively coordinate prior to events. Over 20 languages are spoken within Guatemala, which presents a communication challenge in terms of providing training and disaster-related information to the population. Overcoming communication barriers will extend the reach of disaster management especially in the most vulnerable communities.



### Good Leadership by Professionally Trained Officials



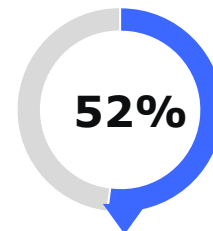
- Training Programs
- Training Frequency
- Exercise Programs
- Exercise Frequency

*Figure 14. Good Leadership by Professionally Trained Officials components*

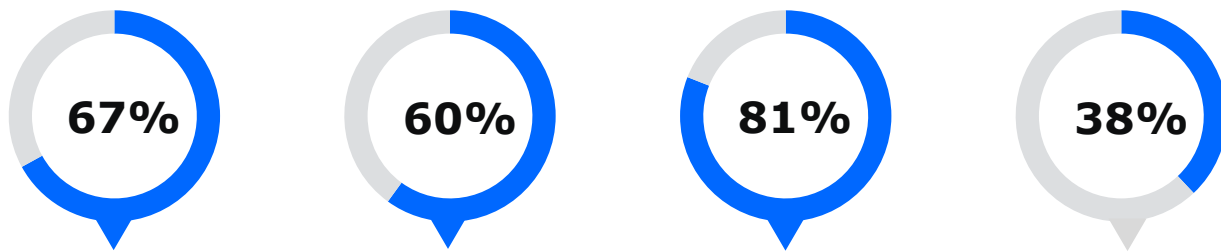
## Training Programs

CONRED does not have a formalized disaster management training program. There are no minimum training standards identified, resulting in personnel lacking foundational knowledge of disaster management practices. These challenges could lead to inefficiencies during preparedness, response, and recovery activities.

Disaster management staff have access to some training through informal programs. About half of survey respondents reported their organizations have a training program to help develop and build capacity in disaster management staff members (see Figure 15). Survey respondents reported receiving training, and few faced barriers to training. Additionally, over 80% stated that training had improved their job effectiveness, indicating that the correct types of training are being offered (see Figure 16).



*Figure 15. 52% of respondents answered yes when asked, "Does your organization have a training program to help develop and build capacity in disaster management staff members?"*



67% said that they had received training in their current positions.

60% expressed that disaster management training was required by their organization.

81% stated that training had improved their job effectiveness.

38% reported they had experienced barriers to attending training.

Figure 16. Survey I results pertaining to disaster management training.

CONRED's *Dirección de Preparación* is responsible for training the population on disaster procedures. The *Dirección de Preparación* conducts a Train-the-Trainer program for CONRED personnel and community leaders to allow them to provide training to the population at the local level.

Other organizations provide training to help fill the training gap.

- The Ministry of Defense runs training programs with local vulnerable communities to build local community resilience.

### Manejo de Centro de Operaciones de Emergencias (MACOE)

CONRED developed and conducted the Manejo de Centro de Operaciones de Emergencias – MACOE (EOC Management) course. The course trains individuals working at the National EOC on how the center functions during emergencies. Although widely acknowledged as a success, the last MACOE was conducted over 10 years ago, and most personnel currently working in the EOC have never received the training.

- U.S. Southern Command (USSOUTHCOM) provides logistical training to CONRED personnel.

### ESEGIR Education Program

CONRED facilitates a three-year bachelor's degree and a one-year master's degree with the University of San Pablo de Guatemala called *Escuela Superior de Estudio en Gestión Integral del Riesgo* (ESEGIR). The ESEGIR program includes a variety of comprehensive risk-management courses and is a positive step towards the professionalization of individuals working for CONRED. The program provides participants with opportunities to network and advance their knowledge of risk management, and indicates that CONRED is seeking partnerships to overcome its budget constraints.



Although this program is facilitated through a partnership between the university and CONRED, it is not a requirement for CONRED employees to have this degree. Additionally, CONRED does not fund its employees to attend this training.

## Training Frequency

Frequent training offerings allow disaster management personnel to advance skills and qualifications and increase their overall capacity in the field. Interviews indicate that CONRED is unable to provide frequent training opportunities due to staff and budget constraints. Training requirements and documentation of training achievements do not exist. However, CONRED's ESEGIR program could provide a method to document staff training achievements.

## Exercise Programs

Two national level exercises and five to seven departmental/municipal exercise are conducted annually. Active volcano exercises are conducted at least once a year. Exercise participation is optional, creating a potential gap in response readiness at all levels of government and limiting exercise effectiveness at the local level. While CONRED has developed a comprehensive list of exercises that covers all hazards that could potentially impact Guatemala, not all exercises are conducted due to operational and funding constraints. CONRED facilitated the following drills and exercises in coordination with partners:

- Testing of Early Warning System for hurricanes;
- Mock influenza;
- Fuerzas Aliadas Humanitarias (FAHUM);
- Mock Coordination Center and Humanitarian Aid;
- Fires;
- Earthquakes;
- Volcanic eruptions;
- Hurricanes;
- Floods;
- Landslides;
- Influenza; and

*When asked: "In your opinion, what types of training help strengthen leadership capacity?" survey responses focused on three main themes:*

- 1) The importance of continuous training to maintain efficiency and qualifications
- 2) The importance of advanced education
- 3) The necessity for teamwork throughout the organization



Figure 17. Responses to "In your opinion, what types of training help strengthen leadership capacity?"

- AH1N1.

CONRED conducts drills within municipalities to determine the level of knowledge and preparedness of community leaders. This information is disseminated through the municipality but often does not reach rural and indigenous populations. Lack of a formalized exercise program limits the effectiveness of exercises at all administrative levels.

### **Exercise Frequency**

CONRED is responsible for authorizing national exercises and drills, including tabletop exercises. Exercises are completed with minimal resources due to budget constraints. Only 55% (52/95) of survey participants indicate that their organizations test, drill, or exercise their disaster plans regularly.

Exercise authority is delegated to departmental governors and municipal mayors to determine the schedules for their respective administrative levels. In many of these areas, dirt roads and volcanic ravines create accessibility challenges during exercise. Access to rural communities was identified as a challenge to effective exercise frequency.

## Successes



### **Education partnerships**

ESEGIR program partnership between CONRED and University of San Pablo de Guatemala.



### **Identified exercise priorities**

CONRED maintains a comprehensive list of identified hazards for exercise prioritization.



### **Decentralized exercise authority**

Departmental governors and municipal mayors have authority to schedule and execute exercises.

## Challenges Identified



### **Training material accessibility**

A multitude of languages throughout the country inhibits the availability of training materials for all communities.



### **Minimum training requirements**

Minimum training requirements for CONRED employees do not exist, impacting the continued professionalization of disaster managers.



### **Training achievement documentation**

A centralized repository to document staff training achievements does not exist, limiting opportunities for growth.



### **Access to professional education**

CONRED employees do not have free access to ESEGIR courses, decreasing the pursuit of continuous learning and professional education.



### **Formalized exercise program**

Lack of a formalized exercise program with participation requirements for agencies at all levels limits exercise efficiency at the national and subnational level.



**Access to rural communities**

Reduced access to rural communities limits exercise participation in these areas.

## Recommendations

01

### Training material accessibility

Ensure that training materials are accessible to all disaster management personnel to promote a standardized approach to disaster management throughout Guatemala.

- A. Work with local leaders to identify all languages and dialects requiring disaster management-related information.
- B. Partner with universities, NGOs, and others to provide required materials.

**Effort:**



**Complexity:** Medium

**Cost:** \$

02

### Minimum training requirements

Establish minimum training requirements for disaster management personnel.

- A. Identify minimum training requirements, which could include: basic knowledge of laws and regulations; the comprehensive disaster management system; basic and advanced EOC operations; information management; basic and advanced disaster management.
- B. Identify and utilize existing in-country resources, including ESEGIR.
- C. Other sources for training courses include the IFRC, Salvation Army, USAID/OFDA, U.S. Federal Emergency Management Agency, regional organizations such as CEPREDENAC, and other national disaster management organizations.

**Effort:**



**Complexity:** Simple

**Cost:** \$

03

### Training achievement documentation

Develop a centralized repository to document staff training achievements to ensure adequately trained staff.

- A. Institutionalize national guidelines for the credentialing of trained professionals.
- B. Identify information to document, which could include: name, organization, position, course attended, date attended, and recertification date (if any).
- C. Work with partners that currently document training achievements to develop a centrally-managed software solution.

**Effort:**



**Complexity:** Medium

**Cost:** \$

04

### Access to professional education

Increase free access to ESEGIR basic courses for CONRED staff.

- A. Work with the university and other partners to identify ESEGIR courses that can be made available to CONRED employees free of charge.
- B. Consider hosting the courses in CONRED facilities using CONRED-provided instructors to reduce costs.

**Effort:**



**Complexity:** Simple

**Cost:** \$



05

### Formalized exercise program

Establish and resource a national exercise program that includes participation requirements for all levels of government.

- A. Work with partners to develop legislation to require exercise participation at all levels of government.
- B. Institutionalize an annual exercise program that regularly exercises procedures and documents lessons learned.
- C. Work with partners to develop a centralized repository system that documents exercises and lessons learned.

**Effort:**



**Complexity:** Complex

**Cost:** \$\$

06

### Access to rural communities

Partner with universities, NGOs, and other agencies at local levels that can support exercises in rural areas where access is a challenge.

- A. Develop and implement a program to work with local partners to provide support to exercises in remote areas.
- B. Possible partners include universities, school-district personnel, NGOs/INGOs, community-based organizations, and other government agencies with local offices.

**Effort:**



**Complexity:** Medium

**Cost:** \$



# Foundation of Supportive Values for Government Action

## Annual Budget

As demonstrated by the RVA, a lack of economic capacity serves as a significant challenge for effective disaster management in Guatemala. Survey respondents repeatedly identified the budget as a challenge to effective disaster response, and indicated that additional budget allocations for disaster management would make disaster response more effective. While a national annual budget for disaster management does exist, it is not adequate to meet the needs of the country.

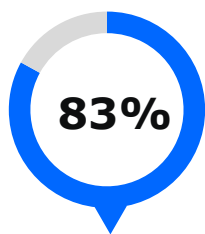


Figure 19. 83% answered NO to Question #18 of Survey I "In your opinion, is the national disaster-management budget adequate to disaster management requirements?"

CONRED receives an annual budget that varies each year. CONRED's 2017 fiscal year budget was 54M Quetzales (Approx. \$7.4M USD). The annual budget covers static expenses such as salaries, rent, and utilities. CONRED staff stated that the budget is inadequate (they have identified a need for 110M Quetzales per year), but that more funding can be requested from the national government as necessary.

No funding from the national level is provided for regional or departmental disaster management budgets. Outside of wages and office supplies, municipalities are responsible for identifying their own funding sources for disaster management, only 46% of have done so<sup>2</sup>. NGOs and INGOs are only able to provide minimal funding assistance at the local level due to accessibility and budget constraints.

## Disaster Reserve Fund

Guatemala's national disaster reserve fund (Fondo Nacional de Emergencia - National Emergency Fund) is funded by an 8M Quetzales (~ \$1M USD) annual appropriation. The emergency fund is for immediate use in the event of a disaster, the amount currently in the fund is unknown.

Guatemala's 8-year combined economic-loss moving average is 1.4B Quetzales (\$187M USD), which equals an average of 171M Quetzales (\$23M USD) annually<sup>3</sup>.



### Foundation of Supportive Values for Government Action



- Annual Budget
- Disaster Reserve Funds
- Appointed/Cabinet Level Position

Figure 18. Foundation of Supportive Values for Government Action components

<sup>2</sup> Censo de Gestión Ambiental Municipal 2012

<sup>3</sup> PreventionWeb

This number indicates that the current Fondo Nacional de Emergencia is inadequate to support response activities. CONRED, however, has the option to request additional funds by initiating a Protocol of Post-Disaster Recovery, which details recovery projects and activities (to be validated by the Executive Secretary) to be conducted post-disaster.

*Ley y Reglamento 109-96* established funding for disaster risk reduction (DRR) through the National Fund for Disaster Reduction (*Fondo Nacional para la Reducción de Desastres* - NFDR). The NFDR is held at the Banco de Guatemala and is capitalized with national and international donations and with funds from the State when possible. The National Counsel for Disaster Reduction, based on the National Plan for Mitigation and Disaster Assistance (*Plan Nacional de Mitigación y Atención de Desastres*), will manage the capitalization of the NFDR according to Article 112 of *Ley y Reglamento 109-96*. The NFDR may be utilized, as approved by the National Counsel, to finance DRR initiatives. The World Bank donated 20M Quetzales (Approx. \$2.72M USD) nearly five years ago for DRR activities, the existence of this fund or if it was spent on DRR activities is unknown.

### **Appointed/Cabinet-level Position**

*Ley y Reglamento 109-96* established CONRED as the designated disaster management authority for Guatemala. The Executive Secretary of CONRED is appointed by the President of the Republic but does not hold a cabinet or a secretarial level position. The law appoints the National Ministry of Defense (*Ministerio de la Defensa Nacional*) as the Coordinator of the National Council for Disaster Reduction (*Consejo Nacional para la Reducción de Desastres*) with responsibility for working with assigned resources, including the NFDR.

While the Executive Secretary of CONRED does not have a direct organizational line to the President, recent events have shown that the Executive Secretary is able to access the President in times of national emergency. Despite this, the lack of an official cabinet-level position is consistent with what survey respondents referred to as a lack of political will and institutional leadership.

## Successes



### **Annual budget appropriation**

Funding is appropriated annually for the operational needs of CONRED.



### **National disaster reserve fund**

Guatemala has established a national emergency fund and a national fund for disaster risk reduction.

## Challenges Identified



### **Budget constraints**

CONRED's budget allocations are insufficient to effectively complete disaster management activities, limiting CONRED's overall effectiveness.



### **Subnational budget constraints**

Inadequate disaster management funding at the subnational level increases reliance on CONRED and amplifies the difficulty of decentralizing the disaster management system in the country.



### **National Emergency Fund**

An insufficient amount of money in the national emergency fund, reduces the effectiveness of response activities.



### **National Fund for Disaster Reduction**

No guaranteed annual appropriation to the NFDR (funding is dependent on donations and availability of excess money in the national budget) limits the country's ability to conduct DRR activities focused on mitigation and preparedness.



### **Cabinet-level position**

A disaster management cabinet-level position does not exist, indicating a lack of political support for the prioritization of disaster management initiatives.



## Recommendations

**01**

### Budget constraints

Work with partners to identify alternative funding sources and methods to increase the availability of funds dedicated to disaster management, increasing CONRED’s capacity.

- A. Alternative funding sources could include:
  - a. partnerships to conduct staff training and exercises;
  - b. developing an internship program to advance specific projects;
  - c. developing and training a national corps of volunteers to support CONRED preparedness and response activities; and
  - d. developing grant proposals for foreign-government or NGO funding.
- B. Ensure that all ongoing and upcoming DRR activities align with Guatemala’s DM goals and objectives.

**Effort:**



**Complexity: Medium**

**Cost: \$**

**02**

### Subnational budget constraints

Create incentives for departments and municipalities to promote the development and maintenance of disaster management budgets at the subnational level. Explore additional funding and other support from NGOs, private sector, and universities to enhance disaster management capabilities at all levels.

- A. Work with partners, including international partners, NGOs, private sector, and universities, to explore incentive programs to encourage subnational governments to develop and maintain disaster management budgets.
- B. Incentives could include matching funds from the national government or international donors. Work with universities and NGOs to develop community-based

disaster education, preparedness, and response programs.

**Effort:**



**Complexity: Complex**

**Cost: \$**

**03**

**National Emergency Fund**

Work with national and international partners to identify alternative sources to increase appropriations to the National Emergency Fund to a level where it can cover all disaster expenses incurred each year based on a 20-year disaster-loss average.

- A. Work with international and national partners to identify alternative funding sources.
- B. Explore non-traditional funding sources, including:
  - a. licensing fees for gas stations and INGO fees.
  - b. adding a tax to each property-insurance policy issued;
  - c. additional fees for development/building permits in higher-risk areas; and
  - d. implementing a tourist-visa fee.

**Effort:**



**Complexity: Complex**

**Cost: \$\$**

**04**

**National Fund for Disaster Reduction (NFDR)**

Review and modify legislation to set an annual budget for the NFDR, and work to identify alternative funding sources from NGOs and private sector to strengthen the capacity of the NFDR to allow preparedness and mitigation activities.

- A. Work with partners to identify the appropriate annual budget of the NFDR.



- B. Review and develop legislation to align NFDR activities with national DRR goals and objectives.
- C. Develop alternative mechanisms, such as partnerships with traditional and non-traditional DM actors, to ensure the NFDR is funded at the appropriate level.

**Effort:**



**Complexity: Medium**

**Cost: \$**

**05**

**Cabinet-level position**

Explore establishing a cabinet-level position that represents CONRED's interest at a higher level to improve the government's visibility and support of DM initiatives.

- A. Work with government partners to identify the requirements of, and the need for, a cabinet-level disaster management position.
- B. If needed, develop legislation to ensure the position becomes permanent.

**Effort:**



**Complexity: Complex**

**Cost: \$**



## Legal Authority to Act

### Disaster Management Legislation

Current and comprehensive legislation serves to effectively guide interagency cooperation, planning, preparation, mitigation, and response operations. In the last decade, Guatemala has attempted to fully integrate disaster management into its national development legislation and develop a more proactive disaster management system, beginning with the passage and implementation of *Ley y Reglamento 109-96 (Ley de la Coordinadora Nacional para la Reducción de Desastres)* in 1996. *Ley 109-96* established Guatemala’s disaster management structure and national disaster management organization, the *Coordinadora Nacional para la Reducción de Desastres (CONRED)*. The *National Development Plan (Plan de la Esperanza)* and the *National Program for Disaster Prevention and Reduction (PNPMD) 2009-2011*<sup>4</sup> include strategies to enhance the country’s comprehensive disaster risk management.

Guatemala has continuously improved and adapted legislation based on recent disasters and experiences. CONRED is considering updating *Ley 109-96* and the Guatemalan Red Cross is working with CONRED to rewrite the law to increase flexibility during times of disaster.

In the process of strengthening *Ley 109-96* to increase presence throughout the country, staff from Guatemala City will relocate to four regions in Guatemala forming Regional Emergency Operation Centers to decrease response time and decentralize operations. In 2002, Guatemala furthered efforts to decentralize and passed its General Decentralization Law, resulting in a more equitable balance of power and more autonomous local governments for the country. However, community development and policy implementation have been hampered at the local level by a lack of adequate funding from the national government<sup>5</sup>.



### Legal Authority to Act



- Disaster Management Legislation
- Designated Authorities
- Disaster Management Availability
- Documentation/SOP Update Frequency

Figure 20. Legal Authority to Act components

<sup>4</sup> GFDRR, 2013, p. 37

<sup>5</sup> The Hunger Project, 2015

## Designated Authorities

Clarity regarding roles and responsibilities for all stakeholders engaged in a country’s disaster management system is essential to minimize duplication of effort and maximize the utilization of limited resources. Survey respondents indicated that Guatemala requires further clarity regarding designated authorities and responsibilities. Only about half of survey respondents felt that disaster response tasks were clearly defined in the country, and 54% felt that there was overlap between organizations active in disaster response in Guatemala (see Figure 21). Additional survey data identified coordination at all levels of government as a significant challenge to effective disaster response (see Figure 22).

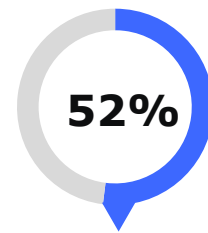


Figure 21. 52% answered YES to Question #11 of Survey III “In your opinion, are disaster response tasks clearly defined?”



Figure 22. Responses to Survey III Question 19 “In your opinion, what would make disaster response more effective in Guatemala?”

Along with its Secretariat (SE CONRED), CONRED is responsible for disaster prevention and mitigation, as well as rehabilitation and reconstruction of the country post-disaster. The implementing regulations for CONRED were released in 2012. CONRED maintains five regional administrative offices across Guatemala, which serve as coordination and data hubs during disaster damage and loss assessments.

Both CONRED and the National Roundtable for Dialogue on Disaster Risk Reduction Management (Mesa Nacional de Diálogo en Gestión para la Reducción de Riesgo a Desastres) are responsible for the coordination and implementation of the Hyogo Framework for Action in Guatemala. The National Roundtable (also referred to as the National Platform for DRR) was established in 2009 as “a mechanism for strengthening the sectoral efforts surrounding DRR management” and provides various disaster management stakeholders with a forum in which to collaborate and communicate<sup>6</sup>. The National Roundtable has significantly advanced multi-hazard and vulnerability mapping, land-use planning, budget tracking for DRR, and the formulation of a National Disaster Risk Management Policy and Strategy.

<sup>6</sup> UNISDR, n.d.

CONRED works as a national umbrella system that involves all disaster management supporting agencies. They coordinate activities between public- and private-sector agencies at all administrative levels: local (COLRED), departmental (CODRED), regional (CORRED), and national (CONRED).

Guatemala handles disasters at the lowest level possible. If local and municipal resources are not sufficient to handle the disaster, departmental assistance is provided. A national emergency is declared when local and departmental response resources are overwhelmed, CONRED then provides supplies, personnel, and logistics support. Declaration of a national disaster also allows access to the NFDR and international requests for assistance. The disaster management system is hierarchical, with each level of government responsible for conducting disaster-response operations within the territorial limits of the jurisdiction.

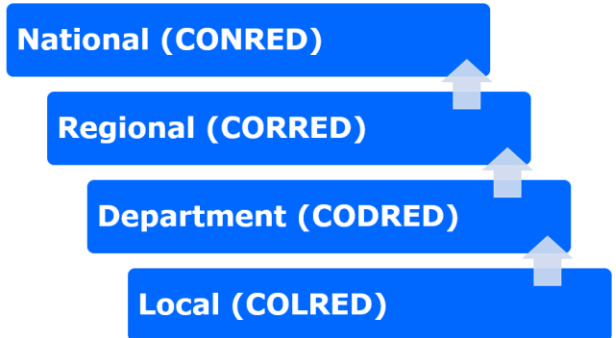
#### *COLRED/COMRED – Local and Municipal Level*

At the local level, the municipal mayor is mandated by law<sup>7</sup> to lead the disaster management organization, COLRED, and DRR activities. The mayor also leads the COMRED and coordinates with representatives from health, police, fire, and education; other sectors are not represented at the COMRED. Indigenous leaders are consulted by municipal mayors for disaster management in some areas, although the government only recognizes indigenous authorities in rural areas.

#### **Municipal Building Codes**

Municipalities are responsible for enforcing building regulations and authorizing permits. Building codes only apply to new constructions, many existing buildings do not meet building code requirements. The Structural Engineers Association maintains the building codes, and CONRED works with them to ensure that codes are followed.

Only 28% of Guatemala's municipalities have an office for risk management, 22% have a permanent committee for DRM, and 19% have a committee for disaster prevention and mitigation<sup>8</sup>.



<sup>7</sup> Government Agreement 49-2012: regulation of the Law of the National Coordinator of Disaster Reduction

<sup>8</sup> Censo de Gestión Ambiental Municipal 2012

### *CODRED – Department Level*

At the departmental level, the governor leads the CODRED and is responsible for organizing the rest of the institutions for DRR. Each department has representation from the ministries and secretariats of the central government, and they are available to assist the CODRED. CODRED representatives also serve to coordinate between the COMREDS and the regional and national levels for support. If a disaster surpasses the department's capacity to respond, the governor may request support from CONRED.



Figure 23. Escuintla Department (CODRED) EOC, offices, and warehouse

### *CORRED – Regional Level*

The CORRED is an administrative agency that helps with coordinating and organizing the departments by region. CORRED representatives help coordinate between the departments within its region and CONRED. CORRED does not have response capability.

### *Other Supporting Organizations*

Many other agencies have roles in support of CONRED (and at all levels of the government). The lack of a specific mechanism to facilitate coordination of these agencies impedes the effectiveness of the disaster management system. Other DRR organizations include:

- The National System of Urban and Rural Development Councils is integral to the implementation of DRR in Guatemala. They exist at national, regional, departmental, municipal, and community levels<sup>9</sup>.
- INSIVUMEH (Instituto Nacional de Sismología, Vulcanología, Meteorología e Hidrología) monitors natural phenomena for the country including: flooding, hurricanes, volcanic activity, earthquakes and tremors, landslides, movements, and displacements. INSIVUMEH provides all information to CONRED for decision-making and disaster management activities.
- The Ministry of Education (*El Ministerio de Educación*) has a System of Governance in Risk and Disaster Management for School Safety (247-2014).

<sup>9</sup> IFRC, 2012, p. 9

- The Ministry of Roads (*El Ministerio de Caminos*) has a response organization that responds to blocked roads with personnel and machinery at regional sites to react quickly.
- The Ministry of Defense (*Ministerio de la Defensa*) organized the Humanitarian Rescue Unit (*Unidad Humanitaria de Rescate*) (UHR) in 2004 for the purpose of humanitarian aid. Personnel in the UHR receive technical training that personnel in other military units do not (see Figure 24). The UHR is meant to deploy as first responders while other military units mobilize. The UHR works in Guatemala and other member countries that make up the Armed Forces of Central America to mitigate the effects of disasters and save lives. Ministry of Defense has a permanent liaison in CONRED who works with CONRED when military forces are requested.



Figure 24. UHR training and response resources

- The Ministry of the Interior (*Ministerio de Gobernación*) is responsible for the management of the internal security and safety of the country. The National Civil Police (NCP) is the largest division in the ministry, during a disaster the NCP provides security for the population and professionals working in response. They are also utilized to provide accurate information to the general public during a disaster and lend support in search and rescue operations. The Minister of Interior is part of the National Council of CONRED, guidelines coming from the Council go directly to the NCP per CONRED's request.
- SEGEPLAN is responsible for planning for the nation, planning incorporates three strategic approaches:
  - Equity;
  - Management for results; and
  - Risk management and adaptation to climate change.

Climate change is incorporated into planning at all levels. SEGEPLAN also provides guidelines for municipalities in terms of analyzing risks prior to public investments/projects. SEGEPLAN is mandated to review and give planning guidance for all departments in Guatemala and it operates a risk management office that provides building codes for construction in disaster-prone areas.

Guatemala has done a successful job of establishing disaster management legislation and designating authorities. However, complexity and a lack of clarity exists, limiting effective coordination among disaster management agencies and causing potential duplication of effort.

## Disaster Management Documentation Availability

The coordination of disaster management activities across a broad range of partner organizations is most successful when partners are encouraged to engage throughout the planning process, from the initial drafting of plans to the sharing of relevant plans between organizations. Survey results stated that 60% of stakeholders participated in the drafting of their organization's disaster management plans, and 60% reported having a copy of those plans. However, less than half of organizations have shared their plans with other agencies or organizations active in disaster management, indicating that there is still a need to promote interagency planning and collaboration in Guatemala (see Figure 25).

Every government institution must develop a disaster-response plan produced, delivered, reviewed, and approved under the direction of CONRED. Plans include how an institution will liaise with CONRED during disaster events and what level of decision-making authority an institution maintains. Along with reviewing plans, CONRED conducts site visits to evaluate plans and institutional facilities. Plan approval is dependent upon the plan working successfully during simulations and drills. CONRED holds all data and plans on file, but only hard copies of plans are available, limiting accessibility.

The development of standard operating procedures (SOPs) and plans within agencies are complete or in progress. Over three-quarters of organizations reported having CDM, preparedness, or response plans. However, just over half of respondents reported having a disaster-mitigation or long-term recovery plan.

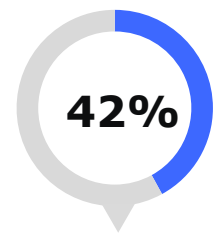
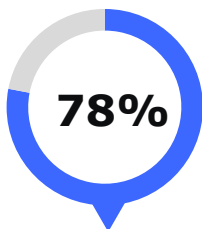
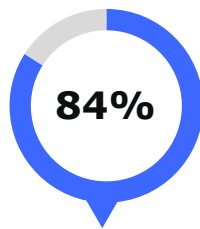


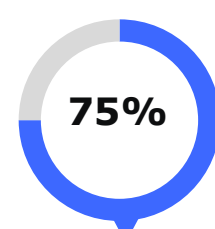
Figure 25. 42% answered YES to Question #9 of Survey II "Has your plan been shared with other agencies or organizations active in disaster management?"



78% answered YES to "Does your organization have a comprehensive disaster-management plan?"

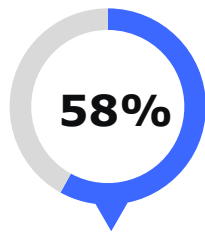


67% answered YES to "Does your organization have a disaster response plan?"

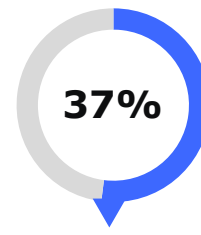


75% answered YES to "Does your organization have a comprehensive disaster preparedness plan?"





58% answered YES to "Does your organization have a disaster mitigation plan?"



37% answered YES to "Does your organization have a long-term recovery plan?"

Figure 26. Availability and accessibility of disaster plans, according to Survey II results

Survey results indicate that not all disaster plans are comprehensive in nature, with only 59% reporting their plans cover all hazard types. Most respondents' organizations included evacuation, logistics, and EOC activation in their disaster plans. A key deficiency in this area is recovery planning, with only 37% reporting that their plans incorporate long-term community recovery (see Figure 26 and Table 10). Research shows that a lack of pre-disaster recovery planning can result in a slow recovery for communities impacted by disasters. The lack of long-term recovery planning could lead to extended periods of resource diversion and slow growth for the entire country following a major disaster.

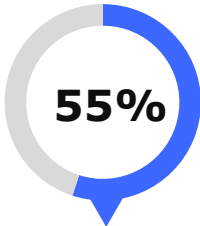
Table 10. Frequency of responses to questions regarding specific elements of disaster management plans

<b>Does plan include information on:</b>	<b>Yes %</b>	<b>No %</b>	<b>Other %</b>
All hazard types	59	22	19
Public outreach	57	29	14
Early warning	58	32	10
Evacuation	74	16	10
Logistics	64	19	17
Shelter operations	46	35	19
EOC activation	64	24	12
Separate SOP for EOC activation	43	37	20
Transportation	46	34	20

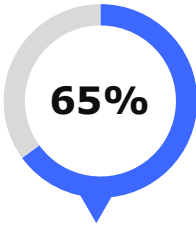
<b>Does plan include information on:</b>	<b>Yes</b>	<b>No</b>	<b>Other</b>
	<b>%</b>	<b>%</b>	<b>%</b>
Communications	62	25	13
Public works and engineering	31	47	22
Public health and medical services	39	42	19
Search and rescue	48	36	16
Hazardous materials	26	49	25
Agricultural and natural resources	27	51	24
Public safety	36	47	17
Long-term community recovery	37	3	60

**Documentation/SOP Update Frequency**

Ministry-level disaster plans are updated every 1-2 years. Department and municipality plans are updated annually. However, only about half of survey respondents reported that their organizations update their disaster plans regularly. About two-thirds reported that their organizations update the SOPs at least every two years (see Figure 27). There are no national standards for reviewing and updating plans and SOPs, and CONRED has no system for incorporating lessons learned and documenting plan updates.



55% answered YES to “Are your organization’s disaster plans updated regularly?” (Question 10)



65% reported updating their SOPs at least every two years (Question 29)

*Figure 27. Responses to Survey II regarding plan and SOP updates*

## Successes



### **Integrated disaster management**

Guatemala is working to fully integrate disaster risk management into its national development agenda to develop a more proactive disaster management system.



### **Designated authorities**

Established legislation designates authorities to cover most disaster management activities.



### **Required plans**

Every governmental institution is required to have a disaster response plan.

## Challenges Identified



### **Designated authority roles**

A lack of clarity regarding the roles and responsibilities of agencies supporting disaster management may result in the duplication of efforts or ineffective use of resources.



### **Accessibility of plans**

A lack of interagency sharing of plans may result in undefined roles and ineffective coordination during disaster events. Digital copies of plans do not exist at any government level, limiting the availability and accessibility of disaster plans.



### **Disaster recovery planning**

Not all organizations have incorporated disaster recovery into their plans. The lack of long-term recovery planning could lead to extended periods of resource diversion and slow growth for the entire country following a major disaster.



### **SOP/plan updates**

National standards for reviewing and updating plans and SOPs do not exist. CONRED has no system for integrating lessons learned and documenting plan updates.



## Recommendations

01

### Designated authority roles

Socialize the roles and responsibilities of all disaster management partners to ensure there is clarity throughout the system.

- A. Create a working group with representatives from all agencies active in disaster management to identify the roles and responsibilities of organizations as they exist in law, regulations, and plans.
  - a. identify gaps and overlaps; and
  - b. implement updates to laws, regulations, and plans.
- B. Develop a training package and plan (hard copy and digital) to provide the information to all disaster management partners.

**Effort:**



**Complexity: Medium**

**Cost: \$**

02

### Accessibility of plans

Promote the interagency sharing of plans to help define roles and responsibilities before, during, and after disaster events. Develop a centralized storage system for disaster plans (digital-copy) to facilitate ease of storage, access, and availability for all stakeholders.

- A. Require agencies to share plans with CONRED.
- B. Create a centralized repository that documents the status of plans and SOPs for all disaster management stakeholders.
  - a. example data fields: date published, reviewed, tested, and approved; name of the person reviewing the plan/SOP; and update status.

**Effort:**



**Complexity: Medium**

**Cost: \$\$**

03

### Disaster recovery planning

Incorporate disaster recovery into organization plans.

- A. Implement requirements for organizations to include disaster recovery in their plans.
- B. Provide information on developing disaster recovery plans to organizations, and work with national and international partners to complete recovery plans<sup>10</sup>.

**Effort:**



**Complexity: Complex**

**Cost: \$\$**

04

### SOP/plan updates

Institutionalize national standards for reviewing and updating plans and SOPs for all disaster management organizations. Establish a mechanism for integrating lessons learned and documenting plan updates.

- A. Develop and promulgate minimum requirements for updating plans and SOPs.
  - a. Example: All plans and SOPs specific to hurricanes are reviewed annually and updated at least every three years. Lessons learned from response activities are documented and integrated into the plans.

**Effort:**



**Complexity: Simple**

**Cost: \$**

<sup>10</sup> UNISDR’s Guidance Note on Pre-Disaster Recovery Planning and PDC/ASEAN’s Disaster Recovery Training Course could provide a foundation for successfully developing recovery plans

## Advocacy Supporting Action

Advocacy supporting action explores the entire community’s involvement in the disaster management system. Data indicates that disaster risk reduction laws are not being implemented at national or subnational levels, and there is a general lack of public support for disaster management, which impacts the overall efficiency and clarity of the disaster management system in Guatemala.

### Recent Disaster Events

Recent disaster events can correlate to a nation’s willingness and ability to support DRM and DRR initiatives. According to survey results, the last major disasters that required Guatemalan organizations to respond included:

- Cambray landslide (October 2015);
- Santa Isabel and Villa Nueva landslide (September 2016); and
- San Marco earthquake (June 2017).

Further survey results highlighted these same disasters as examples of effective disaster response due to efficient information flow and communication, as well as the timeliness and efficiency of response actions. Only about half of survey respondents felt the national response to the last major disaster was effective. Fifty-nine percent (59%; 49/83) felt that the mobilization of resources and response personnel was effective. However, 52% (43/83) felt that disaster alert/warning messages were not issued effectively, indicating that interagency and general public communication requires strengthening.

Additionally, over three-quarters of survey respondents felt that existing DRR laws were not being adequately implemented at the national level or subnational level (see Figure 30). Less than one-third of stakeholders surveyed felt that departments actively support disaster management, while over



### Advocacy Supporting Action



- Recent Disaster Events
- Disaster Declarations
- Recent Disaster Legislation
- Organizations with a Disaster Management Focus

Figure 28. Advocacy Supporting Action components

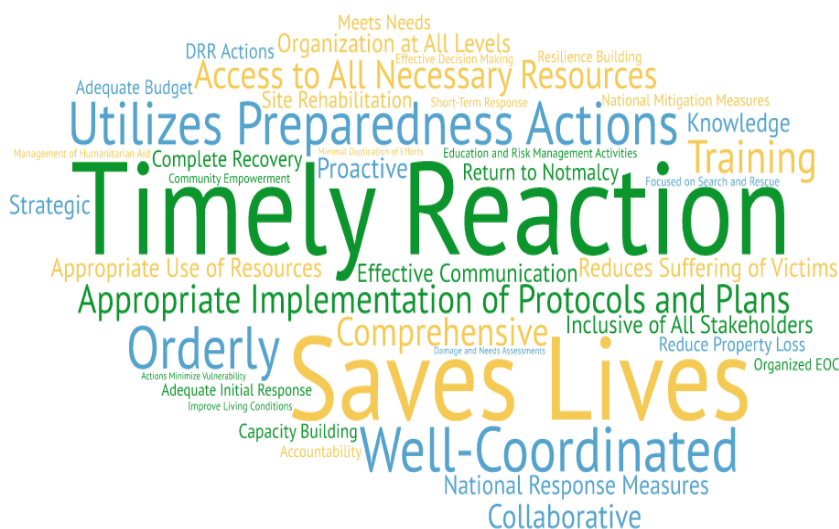


Figure 29: Responses to Survey II defining "effective disaster response"

two-thirds felt that there is not adequate local support for disaster risk reduction (see Figure 31).

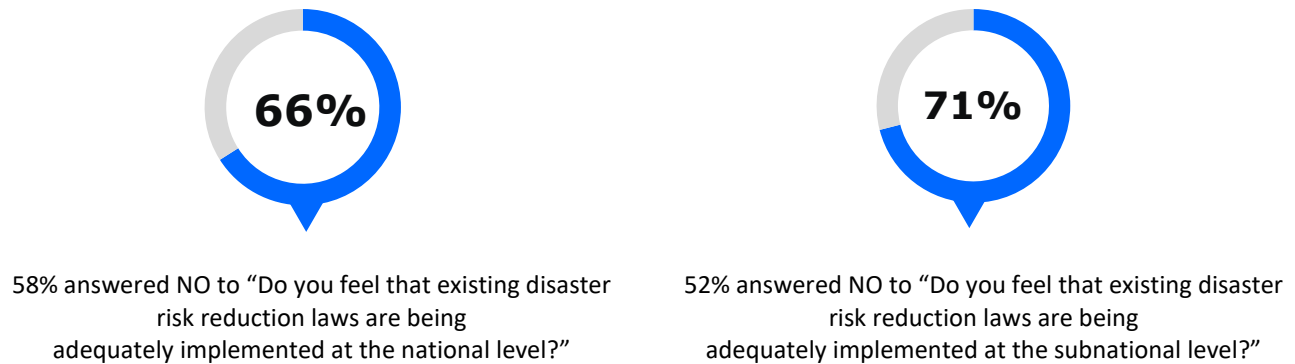


Figure 30. Survey I responses to questions about support for DRR laws in Guatemala

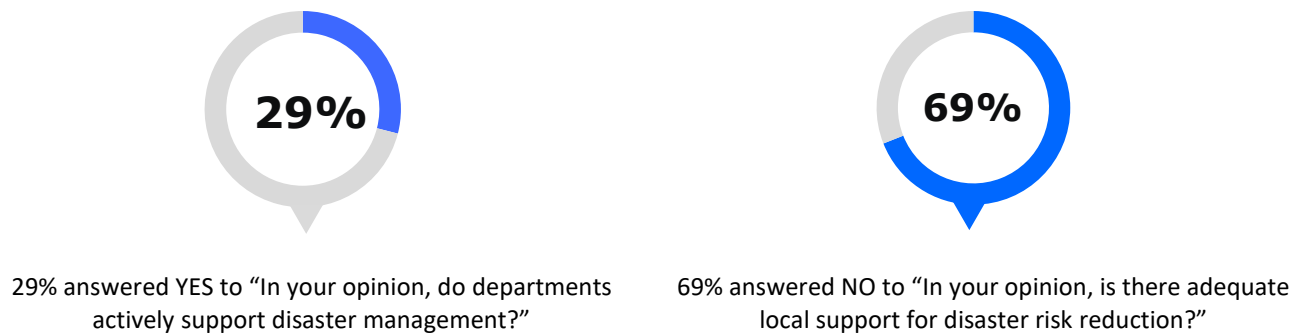


Figure 31. Survey I responses to questions regarding subnational support for disaster management in Guatemala

## Disaster Declarations

CONRED has the responsibility to activate a state of alert in the event of a disaster. Guatemala has two types of disaster alerts – institutional and public.

- Institutional declarations are issued by the Executive Secretary of CONRED to government organizations to alert them to an emergency or disaster and ensure they are responding appropriately.
- If, after issuing an institutional alert, the Executive Secretary of CONRED determines the public should be notified, the Executive Secretary requests that the National Council advise the President to issue the alert. Public alerts are made by the Guatemalan President with support from governors and mayors. The full declaration process is outlined in CONRED's *Plan Nacional de Respuesta*.



The primary means for communicating disaster alerts or warning messages in the country is through telephone advisories (including mobile-phone communication).

Interviews with stakeholders validated this information, though it was also acknowledged that not everyone has access to cell phones

for alerts, which presents a communication challenge for disaster events. Additional means of receiving disaster alerts included email notifications, WhatsApp communication, radio, and notifications via the CONRED system.



Figure 32. CONRED alert levels

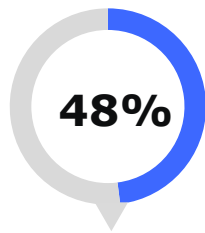
## Recent Disaster Legislation

The adoption of recent disaster legislation is indicative of the Guatemalan government's active and continuous support of DRM and DRR. Based on 2016 SEGEPLAN documentation, recent disaster legislation for Guatemala includes:

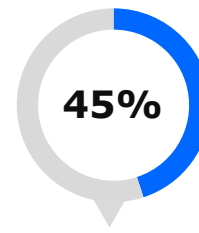
- *Objetivos de Desarrollo Sostenible (ODS)* – September 2015;
- *Sendai Framework for Disaster Risk Reduction 2015-2030*;
- CEPREDENAC's *Política Centroamericana de Gestión Integral de Riesgo a Desastres (PCGIR)* – June 2011; and
- CEPREDENAC's *Plan Regional de Reducción de Desastres 2006-2015*.

## Number of Organizations with a Disaster Management Focus Active in the Country

The involvement of NGOs in the disaster management process encourages community engagement and support for DRM and DRR initiatives. In Guatemala, NGO priorities are established by the national system and are completed in partnership with CONRED. Less than half of stakeholders surveyed felt that NGOs are actively engaged in disaster preparedness at the local level, and 45% felt that NGOs were not effectively supporting national disaster management goals (Figure 72), which may indicate the duplication of efforts between NGOs and other disaster management agencies (see Figure 33).



48% answered YES to “In your opinion, are NGOs actively engaged in disaster preparedness at the local level?”



45% answered NO to “In your opinion, are NGOs effectively supporting national disaster management goals?”

Figure 33. Response to Survey I questions about NGO engagement and support

CONRED made note of partnerships with Save the Children, World Vision, CARE, WFP, and Cruz Roja Guatemalteca (RC). It was further noted that a group of 35 NGOs work together and form a representative body within the humanitarian sector, which meets twice a year and has a working plan. An additional group of 45 institutions collaborate to strengthen capacity and information for humanitarian teams in Guatemala. The group includes governmental and non-governmental organizations, international organizations, the United Nations (UN), private-sector organizations, and universities. International aid is coordinated through this group when the Government of Guatemala can no longer effectively respond to a disaster without outside assistance.

Red de Información Humanitaria para América Latina y el Caribe (Redhum) has an Country Humanitarian Team (*Equipo Humanitario de País* - EHP) contact list, which identifies national and international NGOs engaged in disaster response activities in Guatemala. The list, which was last updated in October 2016, includes a contact person, contact information, the humanitarian sector each organization aligns with, and is made available to organizations who request a copy.

CARE is an active INGO in Guatemala and works closely with CONRED, SEGEPLAN, and CEPREDENAC. Focused on community resilience, risk management, and climate change programs, CARE is engaged in all phases of disaster management. CARE has developed risk prevention tools for community members, as well as creating 20 coordinators for local-level response in the country.

#### Guatemala Red Cross (RC)

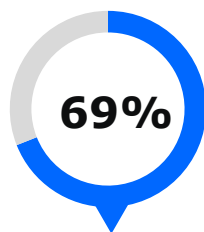
RC has been active in Guatemala for more than 90 years, with 20 regional offices located throughout the country. Municipal RC coordinators serve as local managers of community risks and DRR activities, whose goal is to strengthen municipal capacities, particularly as perceptions of vulnerability and risk stem from communities. RC engages in risk management education, as well as working towards the protection of livelihoods and the impact of climate change on local communities in accordance with the Sendai Framework. During response events, RC provides medical and psychosocial support. The national RC office disseminates information to CONRED, INSIVUMEH, and its 20 regional offices. A RC representative sits at CONRED when requested, usually after an international appeal from the President in the event of a major disaster.

SOUTHCOM has funded projects such as disaster management warehouses, school refurbishments, and medical clinics. USAID has supported initiatives such as the *Barrio Mio* project (in conjunction with Project Concern International (PCI), which aims to reduce disaster risk in hazard-prone neighborhoods in Guatemala through improvements in urban infrastructure, livelihoods, and housing.

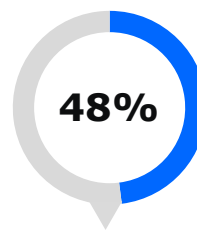
### *Public-private Partnerships*

CONRED also engages in private sector partnerships for disaster management with organizations such as the Instituto Privado de Investigación sobre Cambio Climático/Private Institute for the Investigation of Climate Change (ICC). The ICC's Oficina de Gestión de Riesgos y Desastres focuses on flooding and its larger impacts on Guatemala's corporate industries. While working to improve CONRED's Sistema de Alerta Temprana (SAT) for flooding, the ICC installed the country's first hydro-meteorological station in December 2016. The ICC supports community training and conducts community vulnerability assessments.

At the local level, however, support for disaster risk reduction and public-private partnerships is lacking. Over three-quarters of respondents felt there was not adequate local support for risk management, and almost half felt there was not strong support for private-public partnerships (see Figure 34).



69% answered NO to "In your opinion, is there adequate local support for disaster risk reduction?"



48% answered NO to "In your opinion, is there strong support of public-private partnerships in disaster management at the local level?"

*Figure 34: Survey I results characterizing support at the local level*

Interviews with stakeholders indicated that the private sector stakeholders, including sugar mills and the banana and coffee sectors, have been included in some community-level disaster response efforts.



## Successes



### **Effective disaster response**

According to surveys, response to the last major disasters in Guatemala were effective.



### **Early warning capabilities**

CONRED has the capability to use telephone (mobile and land), radio, e-mail, WhatsApp, and a CONRED system to notify population of a disaster.



### **Mandatory disaster response**

Disaster response support by government agencies is mandatory by law, which encourages the development of partnerships and alliances for disaster management activities.



### **Private sector engagement**

The private sector has been included in community-level disaster response efforts alongside NGOs and government organizations.

## Challenges Identified



### **Local support for DRR**

A lack of public support for DRR initiatives impedes implementation of DRR laws at the subnational level, reducing efficiency of the disaster management system in Guatemala.



### **Early warning for vulnerable populations**

Early warning capabilities rely on technology that is not readily available to all populations, leaving vulnerable groups at higher risk in the event of a major disaster.



### **CONRED/NGO coordination**

NGOs are not effectively supporting national disaster management goals, which may result in the duplication of efforts between NGOs and other disaster management agencies.



## Recommendations

01

### Local support for DRR

Increase public support for DRR initiatives at the local level to increase the effectiveness of the comprehensive disaster management system.

- A. Work with local partners to identify impediments to fully implementing DRR laws at the local level.
- B. Promote programs that encourage community participation. Programs can include:
  - a. disaster preparedness activities in school;
  - b. community-based alerting systems that are designed to reach vulnerable populations; and
  - c. volunteer organizations.
- C. Support NGOs that have a mission to increase community resilience to disasters.

**Effort:**



**Complexity: Complex**

**Cost: \$\$**

02

### Early warning for vulnerable populations

Explore alternative early warning methods that are designed to reach vulnerable populations in the event of a disaster. Early warning allows time to prepare and can reduce the human impact of a disaster event.

- A. Work with national and international partners to identify multiple early warning strategies.
- B. Encourage local-level disaster managers to keep their communities up-to-date on where to access the latest disaster information.

**Effort:**



**Complexity: Complex**

**Cost: \$\$**

**03**

**CONRED/NGO Coordination**

Develop a methodology and a requirement for all government agencies and NGOs conducting DRR activities to provide a project overview and regular status report to CONRED to ensure that all activities align with the priorities set by the national system.

- A. Strengthen legislation that contains reporting requirements for NGOs conducting DRR activities.
  - a. Document requirements in a centralized repository accessible to all organizations to facilitate cooperation and collaboration among agencies.
- B. Utilize the gathered information to work with NGOs to reduce duplication of effort, fill gaps, and increase efficiency.

**Effort:**



**Complexity: Medium**

**Cost: \$**



## Necessary Institutional Resources

Adequate resourcing for the disaster management system is critical for effective preparedness, response, and recovery programs.

### Resources Designated for Disaster Management

A lack of materials and significant budget constraints impact all levels of government in Guatemala. Only three percent of survey respondents felt that the annual national budget was adequate to respond to a major disaster (Figure 36). Because CONRED’s budget primarily covers salaries and institutional functions, institutional resources for other DRR activities are lacking. Very few survey respondents believe the national disaster management budget is sufficient, and only about half believe they have the necessary resources to perform their job requirements. At the institutional level, about half reported their organizations have adequate staffing to conduct disaster response, about one-third report having a budget allocated for disaster response, and only 16% felt the budget was adequate for the last

An inadequate budget, the non-transparent use of existing resources, and a lack of available resources (human, material, and financial) were challenges identified by survey respondents for effective disaster response. A budget focused on increasing access to resources for disaster management and improving the management of resources would enhance the effectiveness of disaster response in Guatemala.

disaster response their organization conducted. Almost three-quarters reported their organizations do not have sufficient inventory to respond to a large-scale disaster, and most felt that sufficient government inventory is not available to respond to a large-scale disaster.

In 2017, CONRED had a total of 359 employees and 106 volunteers, which equals 2.83 trained disaster management personnel per 100,000 persons. Over 20 associations of volunteers provide support in case of emergency. CODREDS have five permanently placed personnel, insufficient to



### Necessary Institutional Resources



- Resources Designated for Disaster Management
- Inventory of Available Resources
- Mutual-aid Agreements
- EOC Supply List

Figure 35. Necessary Institutional Resources components

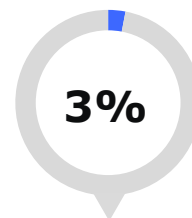


Figure 36. 3% answered **YES** to Question #19 of Survey I "In your opinion, is the national disaster-management budget adequate to respond to a major disaster?"

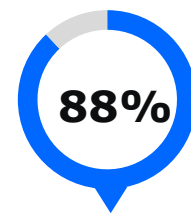


Figure 37. 88% answered **NO** to Question #20 of Survey I "In your opinion, is there sufficient government inventory (supplies) to respond to a large-scale disaster?"

respond to a disaster and conduct necessary tasks. No logistics or technical expertise is resident at CODRED, and the available equipment extends only to what is needed to manage the warehouse. All disaster resources must be funded and provided by CONRED.

Results indicate that Guatemala lacks adequate resources – human, financial, and material - for disaster management activities. A lack of institutional support for disaster management also limits the availability of resources for agencies involved in disaster management. *Ley 109-96* designates CONRED as the lead for response to natural disasters, and it is understood that government resources will be available during a disaster. However, national resources for response are inadequate, and resources at the department and municipality levels are even scarcer. Communities are required to find their own resources for disaster preparedness and response activities.

### *EOC*

CONRED operates a state-of-the-art 24/7 National Emergency Operations Center (NEOC) (see Figure 38). Survey respondents reported that 55% of their organizations maintain an EOC, and only about one-quarter felt that their EOC had adequate resources to perform its responsibilities effectively. To supplement EOCs, CONRED maintains two mobile command posts, which can be deployed to any location to provide emergency operations and coordination support.

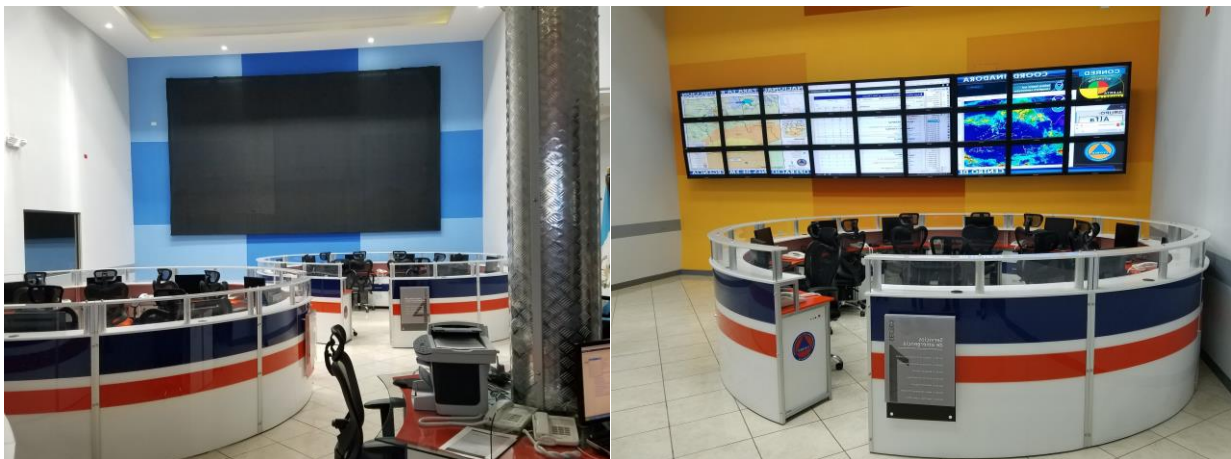


Figure 38. National Emergency Operations Center

### *Warehouses*

CONRED previously maintained 33 Immediate Reaction Warehouses (*Cuartos de Reaccion Inmediata*) throughout the country with a 12-hour immediate response capability that took two hours to reach the desired location from where it was stored. However, this capability was lost after an audit from the Comptroller's office required all national resources be staged at the national warehouses in the capital. Resources

now take up to 48 hours to move from the national warehouse in Guatemala City to points within the country.

SOUTHCOM has funded five new warehouses to be built in strategic locations in Guatemala to support different regions (see Figure 39). These warehouses are made to store a much larger amount of resources and are equipped with a logistics management tool that will help CONRED track its inventory in all warehouses from a central location, allowing them to move resources and track expiration dates. CONRED is working to gain approval from the Comptroller's office to store resources at these regional warehouses and, based on interviews, they do not think it will be an issue. The first warehouse was built in Escuintla, approximately 40 miles SW of Guatemala City. Two additional warehouses were completed in 2017 and waiting for equipment and training, and the last two are under construction.



Figure 39. CONRED's warehouse in Escuintla

### *Shelters*

Emergency shelters are primarily schools, although the Ministry of Education is trying to stop this practice. After about three days, emergency managers try to move the displaced persons from schools to local community centers as transitional shelters. Municipality and department plans have identified over 500 shelters throughout the nation, which include community rooms, municipal warehouses, sports arenas, and churches. Stakeholder interviews indicate that there are sufficient emergency shelters. However, keeping shelters fully functioning at 100% is a known challenge, especially in remote areas.

Ministerio de Salud Pública, SOSEP, USAID, and Cruz Roja support sheltering efforts. These agencies provide registration forms to each family brought into shelter. That information is used to determine how many people and resources should be allocated to each shelter. Some shelters do not meet SPHERE standards (e.g., not enough bathrooms). To address this issue, disaster managers try to balance the shelters for sanitary reasons.

### **Inventory of Available Resources**

CONRED maintains an inventory list of available resources in its main disaster warehouse, the inventory list<sup>11</sup> includes:

- Family rations;

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<sup>11</sup> Resource list is as of March 2017

- Cold rations for adults and children;
- Breakfast, lunch, and dinner rations;
- Poncho blankets and thermal blankets;
- Disposable diapers;
- Sanitary towels;
- Personal hygiene kits;
- Cleaning kits;
- Kitchen kits;
- Water purifiers;
- Cots and folding beds;
- Foam mattresses; and
- 6-person tents.

CONRED indicated that this list is representative of 80% of its disaster relief supplies. As mentioned above, these resources were previously maintained in Immediate Reaction Warehouses around the country but are now stored at CONRED's warehouses in the capital. This poses a challenge when responding to disasters, as resources must be transported by ground to remote locations, significantly increasing the time required for help to reach the affected population. Additionally, should a disaster strike the central location where all resources are located, CONRED could lose its capability to immediately support the population. Distributing resources throughout the country reduces response times and increases capacity. This challenge must be addressed quickly to ensure the effectiveness of CONRED's response capability.

### **Mutual-Aid Agreements**

Budget and resource challenges can be overcome through the implementation of mutual-aid agreements. These agreements can be made between government agencies and NGOs, private sector organizations, and between departments. During a disaster, these agencies can supply their available resources to support each other and fill resource gaps. Many stakeholders reported during surveys that their organizations have mutual-aid agreements (61%) or engage with the military (63%) and/or the private sector (55%) for support during disasters (see Figure 40).

Government ministries, such as the General Directorate of Roads (*Dirección General de Caminos*), maintain mutual-aid agreements that supply resources between regions and from the national center in the event of a disaster.

In Guatemala, mutual-aid agreements exist and help to coordinate disaster risk reduction initiatives at the department and municipality levels. However, a lack of capacity and political support at municipal and local levels impact the formalization of mutual-aid agreements and partnerships prior to a major disaster event.

### *International Aid Agreements*

Guatemala has an international aid agreement with Mexico for volcano and flooding events that require border response efforts, with an option to evacuate affected people to Mexico if necessary. Research highlighted Central American mutual assistance procedures instituted by CEPREDENAC. This regional coordination initiative is a positive step towards overcoming budget and resources challenges, but it comes with mutual-aid challenges that need to be addressed to increase efficiency, including:

- Mechanisms to support the mobilization of material and personnel between borders;
- A lack of capability and logistical skills; and
- The overall sustainability of such mutual assistance initiatives.

### **EOC Supply Lists**

Interviews and research reveal that there are no supply or equipment lists for the various EOCs, inhibiting efficient operations.

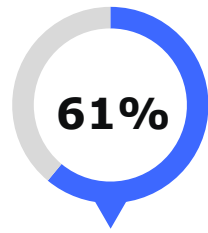


Figure 40. 61% answered YES to Question #5 of Survey III “Does your organization have pre-established agreements for support during times of disaster (i.e. mutual-aid agreements)?”



## Successes



### **24/7 EOC**

CONRED operates a 24/7 National EOC and maintains two mobile command units.



### **Warehouse inventory list**

CONRED maintains an inventory list of available resources at its central disaster warehouse.



### **Informal mutual-aid agreements**

Informal mutual-aid agreements exist at all levels of government, and some formal agreements at the national level exist.

## Challenges Identified



### **Designated DM resources**

Designated resources for disaster management are insufficient to meet response needs during a major disaster, reducing the effectiveness of disaster response operations.



### **Consolidated DM resources**

Resources are consolidated at the warehouse in Guatemala City, impacting the efficiency of aid delivery to communities, resulting in critical delays during relief efforts.



### **Formal subnational mutual-aid agreements**

Lack of formalized mutual-aid agreements at the subnational level may postpone the arrival of supplies during disaster response and relief efforts.



### **EOC supply list**

The absence of an EOC supply list limits the capability and capacity of an EOC to provide support during response and relief operations.





## Recommendations

01

### Designated DM resources

Develop partnerships with traditional and non-traditional DM partners to increase resource availability and promote the sustainable use of resources.

- A. Catalog current resources – human, material, financial – to identify and prioritize resource gaps.
- B. Strategies to increase material resources could include:
  - a. working with NGOs and other national and international partners; and
  - b. identifying alternative funding sources or strategies to leverage existing capabilities to increase capacity.
- C. Strategies to increase human resources could include:
  - a. increasing CONRED’s volunteer corps,
  - b. developing an internship program to utilize students in disaster management programs to assist with response-related projects and training; and
  - c. working with the private sector to develop volunteer programs.

**Effort:**



**Complexity: Medium**

**Cost: \$**

02

### Consolidated DM resources

Continue work to decentralize DM resources and develop a plan to disperse supplies to decrease response time and support relief efforts.

- A. Identify the amounts and types of relief supplies needed in the different regions.
- B. Develop a plan to move supplies to the newly constructed warehouse located strategically throughout the country.
- C. Work with partners to develop an inventory system so all parties can maintain awareness of the status of resources in the various warehouses.

**Effort:**



**Complexity: Medium**

**Cost: \$\$**

03

### Formal subnational mutual-aid agreements

Formal mutual-aid agreements at the subnational level will expedite the arrival of supplies during disaster response and relief efforts.

- A. Create incentives for legislators to work together to create mutual-aid agreements at the municipal and local level.
- B. Assist municipalities with developing and entering into MAAs by providing a template and examples of existing mutual-aid agreements.
- C. Create, and make available to all stakeholders, a centralized repository that sits at CONRED documenting mutual-aid agreements to better understand needs and support response and relief efforts.

**Effort:**



**Complexity: Complex**

**Cost: \$**

04

**EOC supply list**

Develop EOC supply lists to promote the transparent use of resources during a disaster event.

- A. Develop, maintain, and share among disaster management stakeholders a single inventory of all supplies located at EOCs.
- B. Encourage regular updates to the supply lists.

**Effort:**



**Complexity: Simple**

**Cost: \$**



**Better solutions.  
Fewer disasters.  
Safer world.**



# **Recommendations**

**National Disaster Preparedness Baseline Assessment  
Final Report**



# Recommendations

The following recommendations have been developed based on the RVA and CDM findings described in the previous sections. Refer to Table 11 for additional information on the evaluation criteria.

Table 11. Evaluation criteria for CDM recommendations

Recommendations Evaluation Criteria		
<b>Effort</b>	<p>Years</p> <p>0 5</p>	Estimated length of time (in years) to complete the project once it is started.
<b>Complexity</b>	<p>Low <b>Medium</b> High</p>	Overall complexity based on the estimated staff time, resources, and collaboration required to complete the project.
<b>Cost</b>	<p>\$\$\$</p>	<p>Estimated annual cost of the project, not including salaries, based on a percentage of the current NDMO annual budget.</p> <p>\$ approximates less than 1% of the annual operating budget.</p> <p>\$\$ approximates between 1% to 10% of annual operating budget.</p> <p>\$\$\$ approximates more than 10% of the annual operating budget.</p>

## 01

### Strengthen data standards and sharing

- C. Ensure that hazards and vulnerability data are consistently defined, documented, updated, and applied in disaster-management and disaster-risk reduction.
- D. Implement strategies to strengthen data sharing and transparency among all organizations active in disaster management to support evidence-based decision making.



**Complexity:** Medium  
**Cost:** \$

02

**Develop and strengthen multi-stakeholder partnerships**

- A. Increase the capacity to conduct and update high-resolution hazard assessments with national coverage by developing partnerships with non-traditional stakeholders.
- B. Strengthen strategic multi-stakeholder partnerships to expand disaster risk-reduction resources to include non-traditional disaster management partners.

**Effort:**



**Complexity:** Low

**Cost:** \$

03

**Training material accessibility**

Ensure that training materials are accessible to all disaster management personnel to promote a standardized approach to disaster management throughout Guatemala.

- C. Work with local leaders to identify all languages and dialects requiring disaster management-related information.
- D. Partner with universities, NGOs, and others to provide required materials.

**Effort:**



**Complexity:** Medium

**Cost:** \$

04

**Minimum training requirements**

Establish minimum training requirements for disaster management personnel.

- D. Identify minimum training requirements, which could include: basic knowledge of laws and regulations; the comprehensive disaster management system; basic and advanced EOC operations; information management; basic and advanced disaster management.
- E. Identify and utilize existing in-country resources, including ESEGIR.
- F. Other sources for training courses include the IFRC, Salvation Army, USAID/OFDA, U.S. Federal Emergency



Management Agency, regional organizations such as CEPREDENAC, and other national disaster management organizations.

**Effort:**



**Complexity:** Simple

**Cost:** \$

**05**

**Training achievement documentation**

Develop a centralized repository to document staff training achievements to ensure adequately trained staff.

- D. Institutionalize national guidelines for the credentialing of trained professionals.
- E. Identify information to document, which could include: name, organization, position, course attended, date attended, and recertification date (if any).
- F. Work with partners that currently document training achievements to develop a centrally-managed software solution.

**Effort:**



**Complexity:** Medium

**Cost:** \$

**06**

**Access to professional education**

Increase free access to ESEGIR basic courses for CONRED staff.

- C. Work with the university and other partners to identify ESEGIR courses that can be made available to CONRED employees free of charge.
- D. Consider hosting the courses in CONRED facilities using CONRED-provided instructors to reduce costs.

**Effort:**



**Complexity:** Simple

**Cost:** \$

07

### Formalized exercise program

Establish and resource a national exercise program that includes participation requirements for all levels of government.

- D. Work with partners to develop legislation to require exercise participation at all levels of government.
- E. Institutionalize an annual exercise program that regularly exercises procedures and documents lessons learned.
- F. Work with partners to develop a centralized repository system that documents exercises and lessons learned.

**Effort:**



**Complexity:** Complex

**Cost:** \$\$

08

### Access to rural communities

Partner with universities, NGOs, and other agencies at local levels that can support exercises in rural areas where access is a challenge.

- C. Develop and implement a program to work with local partners to provide support to exercises in remote areas.
- D. Possible partners include universities, school-district personnel, NGOs/INGOs, community-based organizations, and other government agencies with local offices.

**Effort:**



**Complexity:** Medium

**Cost:** \$

09

**Budget constraints**

Work with partners to identify alternative funding sources and methods to increase the availability of funds dedicated to disaster management, increasing CONRED’s capacity.

- C. Alternative funding sources could include:
  - a. partnerships to conduct staff training and exercises;
  - b. developing an internship program to advance specific projects;
  - c. developing and training a national corps of volunteers to support CONRED preparedness and response activities; and
  - d. developing grant proposals for foreign-government or NGO funding.
- D. Ensure that all ongoing and upcoming DRR activities align with Guatemala’s DM goals and objectives.

**Effort:**



**Complexity: Medium**

**Cost: \$**

10

**Subnational budget constraints**

Create incentives for departments and municipalities to promote the development and maintenance of disaster management budgets at the subnational level. Explore additional funding and other support from NGOs, private sector, and universities to enhance disaster management capabilities at all levels.

- C. Work with partners, including international partners, NGOs, private sector, and universities, to explore incentive programs to encourage subnational governments to develop and maintain disaster management budgets.
- D. Incentives could include matching funds from the national government or international donors. Work with universities and NGOs to develop community-based

disaster education, preparedness, and response programs.

**Effort:**



**Complexity: Complex**

**Cost: \$**

**11**

### **National Emergency Fund**

Work with national and international partners to identify alternative sources to increase appropriations to the National Emergency Fund to a level where it can cover all disaster expenses incurred each year based on a 20-year disaster-loss average.

- C. Work with international and national partners to identify alternative funding sources.
- D. Explore non-traditional funding sources, including:
  - a. licensing fees for gas stations and INGO fees.
  - b. adding a tax to each property-insurance policy issued;
  - c. additional fees for development/building permits in higher-risk areas; and
  - d. implementing a tourist-visa fee.

**Effort:**



**Complexity: Complex**

**Cost: \$\$**

**12**

### **National Fund for Disaster Reduction (NFDR)**

Review and modify legislation to set an annual budget for the NFDR, and work to identify alternative funding sources from NGOs and private sector to strengthen the capacity of the NFDR to allow preparedness and mitigation activities.

- D. Work with partners to identify the appropriate annual budget of the NFDR.
- E. Review and develop legislation to align NFDR activities with national DRR goals and objectives.
- F. Develop alternative mechanisms, such as partnerships with traditional and non-traditional DM actors, to ensure the NFDR is funded at the appropriate level.

**Effort:**



**Complexity: Medium**

**Cost: \$**

**13**

**Cabinet-level position**

Explore establishing a cabinet-level position that represents CONRED's interest at a higher level to improve the government's visibility and support of DM initiatives.

- C. Work with government partners to identify the requirements of, and the need for, a cabinet-level disaster management position.
- D. If needed, develop legislation to ensure the position becomes permanent.

**Effort:**



**Complexity: Complex**

**Cost: \$**

14

**Designated authority roles**

Socialize the roles and responsibilities of all disaster management partners to ensure there is clarity throughout the system.

- C. Create a working group with representatives from all agencies active in disaster management to identify the roles and responsibilities of organizations as they exist in law, regulations, and plans.
  - a. identify gaps and overlaps; and
  - b. implement updates to laws, regulations, and plans.
- D. Develop a training package and plan (hard copy and digital) to provide the information to all disaster management partners.

**Effort:**



**Complexity: Medium**

**Cost: \$**

15

**Accessibility of plans**

Promote the interagency sharing of plans to help define roles and responsibilities before, during, and after disaster events. Develop a centralized storage system for disaster plans (digital-copy) to facilitate ease of storage, access, and availability for all stakeholders.

- C. Require agencies to share plans with CONRED.
- D. Create a centralized repository that documents the status of plans and SOPs for all disaster management stakeholders.
  - a. example data fields: date published, reviewed, tested, and approved; name of the person reviewing the plan/SOP; and update status.

**Effort:**



**Complexity: Medium**

**Cost: \$\$**

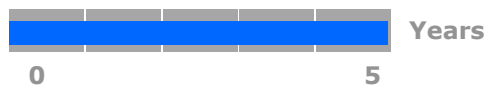
**16**

**Disaster recovery planning**

Incorporate disaster recovery into organization plans.

- C. Implement requirements for organizations to include disaster recovery in their plans.
- D. Provide information on developing disaster recovery plans to organizations, and work with national and international partners to complete recovery plans<sup>12</sup>.

**Effort:**



**Complexity: Complex**

**Cost: \$\$**

**17**

**SOP/plan updates**

Institutionalize national standards for reviewing and updating plans and SOPs for all disaster management organizations. Establish a mechanism for integrating lessons learned and documenting plan updates.

- B. Develop and promulgate minimum requirements for updating plans and SOPs.
  - a. Example: All plans and SOPs specific to hurricanes are reviewed annually and updated at least every three years. Lessons learned from response activities are documented and integrated into the plans.

**Effort:**



**Complexity: Simple**

**Cost: \$**

<sup>12</sup> UNISDR’s Guidance Note on Pre-Disaster Recovery Planning and PDC/ASEAN’s Disaster Recovery Training Course could provide a foundation for successfully developing recovery plans

18

### Local support for DRR

Increase public support for DRR initiatives at the local level to increase the effectiveness of the comprehensive disaster management system.

- D. Work with local partners to identify impediments to fully implementing DRR laws at the local level.
- E. Promote programs that encourage community participation. Programs can include:
  - a. disaster preparedness activities in school;
  - b. community-based alerting systems that are designed to reach vulnerable populations; and
  - c. volunteer organizations.
- F. Support NGOs that have a mission to increase community resilience to disasters.

**Effort:**



**Complexity: Complex**

**Cost: \$\$**

19

### Early warning for vulnerable populations

Explore alternative early warning methods that are designed to reach vulnerable populations in the event of a disaster. Early warning allows time to prepare and can reduce the human impact of a disaster event.

- C. Work with national and international partners to identify multiple early warning strategies.
- D. Encourage local-level disaster managers to keep their communities up-to-date on where to access the latest disaster information.

**Effort:**



**Complexity: Complex**

**Cost: \$\$**



20

**CONRED/NGO coordination**

Develop a methodology and a requirement for all government agencies and NGOs conducting DRR activities to provide a project overview and regular status report to CONRED to ensure that all activities align with the priorities set by the national system.

- C. Strengthen legislation that contains reporting requirements for NGOs conducting DRR activities.
  - a. Document requirements in a centralized repository accessible to all organizations to facilitate cooperation and collaboration among agencies.
- D. Utilize the gathered information to work with NGOs to reduce duplication of effort, fill gaps, and increase efficiency.

**Effort:**



**Complexity: Medium**

**Cost: \$**

21

**Designated DM resources**

Develop partnerships with traditional and non-traditional DM partners to increase resource availability and promote the sustainable use of resources.

- D. Catalog current resources – human, material, financial – to identify and prioritize resource gaps.
- E. Strategies to increase material resources could include:
  - a. working with NGOs and other national and international partners; and
  - b. identifying alternative funding sources or strategies to leverage existing capabilities to increase capacity.
- F. Strategies to increase human resources could include:
  - a. increasing CONRED’s volunteer corps,
  - b. developing an internship program to utilize students in disaster management programs to

- assist with response-related projects and training; and
- c. working with the private sector to develop volunteer programs.

**Effort:**



**Complexity: Medium**

**Cost: \$**

**22**

**Consolidated DM resources**

Continue work to decentralize DM resources and develop a plan to disperse supplies to decrease response time and support relief efforts.

- D. Identify the amounts and types of relief supplies needed in the different regions.
- E. Develop a plan to move supplies to the newly constructed warehouse located strategically throughout the country.
- F. Work with partners to develop an inventory system so all parties can maintain awareness of the status of resources in the various warehouses.

**Effort:**



**Complexity: Medium**

**Cost: \$\$**

**23**

**Formal subnational mutual-aid agreements**

Formal mutual-aid agreements at the subnational level will expedite the arrival of supplies during disaster response and relief efforts.

- D. Create incentives for legislators to work together to create mutual-aid agreements at the municipal and local level.
- E. Assist municipalities with developing and entering into MAAs by providing a template and examples of existing mutual-aid agreements.

F. Create, and make available to all stakeholders, a centralized repository that sits at CONRED documenting mutual-aid agreements to better understand needs and support response and relief efforts.

**Effort:**



**Complexity: Complex**

**Cost: \$**

**24**

**EOC supply list**

Develop EOC supply lists to promote the transparent use of resources during a disaster event.

C. Develop, maintain, and share among disaster management stakeholders a single inventory of all supplies located at EOCs.

D. Encourage regular updates to the supply lists.

**Effort:**



**Complexity: Simple**

**Cost: \$**



## Conclusion

The goal of the Guatemala NDPBA was to develop and conduct a baseline assessment focused on risk and vulnerability identification, and evaluation of existing disaster management capacities, leading to enhanced resilience to future hazards. Using two concurrent, stakeholder-driven analyses – Risk and Vulnerability Assessment (RVA) and Comprehensive Disaster Management (CDM) – the Guatemala NDPBA results provide a comprehensive understanding of the strengths and challenges for managing and reducing disaster risk in Guatemala. Emerging from these results are actionable recommendations to increase disaster management capabilities and guide investments with an aim to strengthen overall resilience.

The goal of the RVA was to characterize the elements of multi-hazard risk, and estimate the likelihood of a negative occurrence given exposure to natural hazards. RVA results describe the collective characteristics of each department that predispose it to detrimental hazard impacts, including an examination of Multi-Hazard Exposure, Vulnerability, and Coping Capacity.

The results of the RVA highlighted areas of the country that may require support in preparing for, responding to, and recovering from disasters. By identifying specific factors that influence risk in each department, the RVA supports evidence-based decision making through focused interventions that increase coping capacity, reduce vulnerability, and acknowledge hazard exposure at the subnational level. In summarizing the results of the RVA across Guatemala, prevalent drivers of risk included low economic capacity, reduced access to information, and gender inequality.

Effective disaster management creates safer communities and is composed of programs that protect human life, reduce losses, and promote rapid recovery. Disaster management activities are most effective when informed by risk and vulnerability information, such as what hazards are most likely to occur and where, and who and what may be in harm's way. Characteristics of the population and the built environment play a key role in determining vulnerability to hazard impacts and potential losses. Investing in projects and programs that aim to reduce risk and vulnerability and boost disaster management capacities and capabilities will promote resilience and support sustainable long-term growth and development.

Using a mixed-methods approach, the CDM assessment examined preparedness and response capacities and capabilities in Guatemala. Assessment results provide actionable recommendations that draw on existing strengths and address possible gaps that affect the delivery of effective disaster management.

Guatemala has all the key components for an effective, comprehensive disaster management system. Legislation and authorities are in place to ensure CONRED and supporting agencies have the legal authority to make decisions regarding

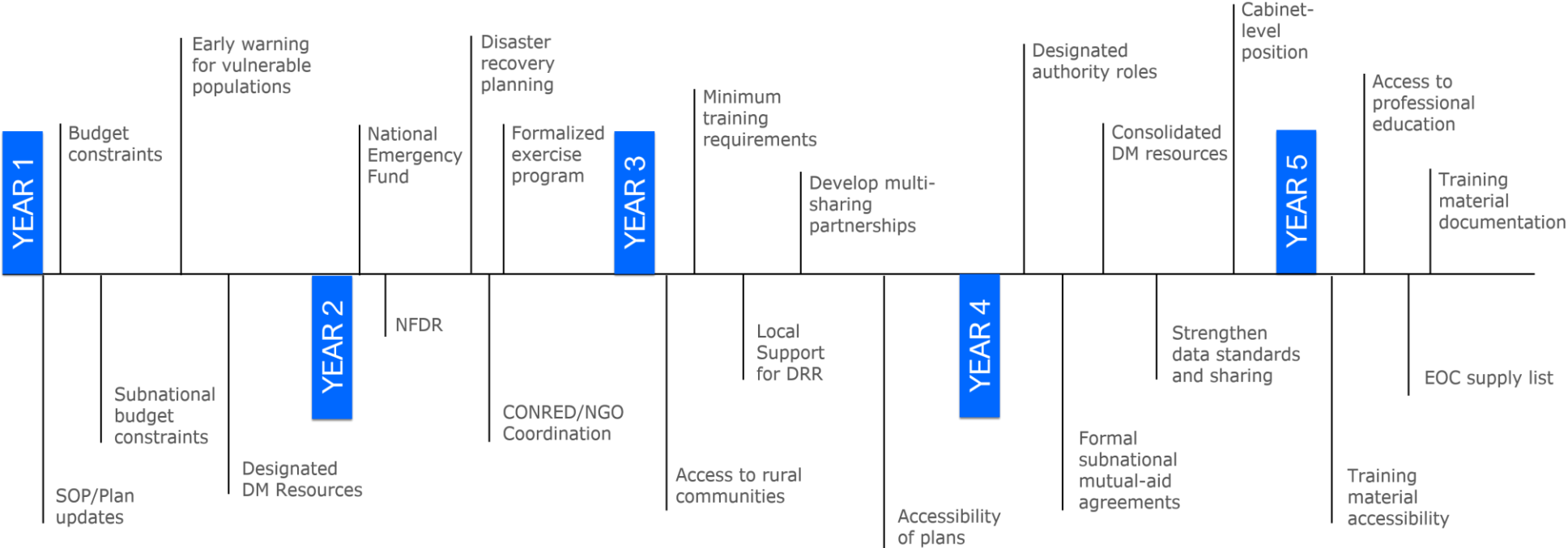
disaster events. Training opportunities exist to support the professionalization of the disaster management community, and a list of identified exercises aid staff members in practicing their training and assessing their strengths and challenges. Guatemala has a national disaster management budget, which helps support disaster management activities throughout the country. Additionally, Guatemala has designated resources, such as EOCs, warehouses with response supplies, and close partnerships with NGOs and the public and private sectors to fill in gaps as needed.

Guatemala has taken important steps towards establishing a framework to effectively prepare and respond to disasters. The results are reflected in the country's historical improvement in disaster management, even with the increase of populated urban centers, making its population more susceptible to disasters. Being able to identify ways to overcome challenges through collaborative partnerships has made CONRED and Guatemala stronger and more capable of maintaining an effective comprehensive disaster management system.

The RVA and CDM elements of the NDPBA are complementary, providing valuable context for increasing resilience in Guatemala. The RVA helps disaster managers decide where and how to focus limited resources, and enables them to anticipate the severity of impacts and the need for response activities, such as evacuation and sheltering. The CDM assessment characterizes the structure and capacity of the country's disaster management system, through which DRR activities will take place.

The recommendations provided in this assessment are designed to be implemented over the next five years (see ), after which time a follow-up assessment can be used to evaluate program effectiveness and progress from the baseline provided by the NDPBA. As a measurable and repeatable approach, the NDPBA provides a methodology to support national and regional efforts to save lives and protect property by continuing to build a more disaster-resilient nation.

# 5-Year Plan







**Better solutions.  
Fewer disasters.  
Safer world.**



# **Findings: Department**

**National Disaster Preparedness Baseline Assessment  
Final Report**



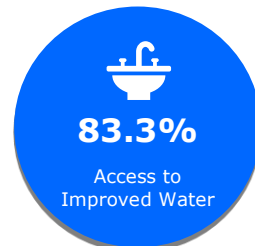
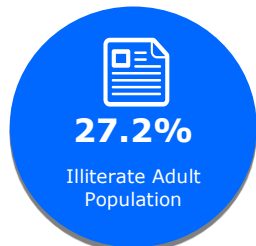
**Department: Quiché**



Department Capital: Santa Cruz del Quiché

Area: 8,378 km<sup>2</sup>

Quiché is located in the northern part of Guatemala and is one of the more populous departments in the country. Almost 90% of the department's population is of Mayan descent.



**Municipality**

- Chichicastenango
- Santa Cruz del Quiché
- Ixcán
- Nebaj
- Joyabaj
- Uspantán
- Chajul
- Zacualpa
- Sacapulas
- Cunén
- Chicamán
- San Pedro Jocopilas
- San Juan Cotzal
- Chiché
- San Andrés Sajcabajá
- San Antonio Ilotenango
- San Bartolomé Jocotenango
- Canillá
- Chinique
- Pachalum
- Patzité

**Population**

- 169,162
- 125,415
- 118,886
- 102,519
- 93,352
- 80,528
- 65,282
- 61,927
- 52,792
- 41,816
- 41,646
- 32,443
- 31,794
- 31,431
- 28,814
- 22,614
- 19,400
- 14,075
- 12,169
- 9,237
- 6,564



**Multi-Hazard Risk Rank:  
Very High (1 of 22)**

**Lack of Resilience Rank:  
Very High (3 of 22)**

**RVA Component Scores**

Table 9. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Very High		Very High		Moderate		Very High		Very Low	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.632	1	0.638	3	0.621	9	0.587	4	0.311	20

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>13</sup> Rank: 9 of 22 Departments (Score: 0.621)

Table 10. Estimated ambient population<sup>14</sup> exposed to each hazard



Cyclone

**52%**

**442,754 People**



Earthquake

**100%**

**847,660 People**



Volcano

**74%**

**624,887 People**



Flood

**3%**

**27,518 People**

Second-lowest flooding exposure in the country



Landslide

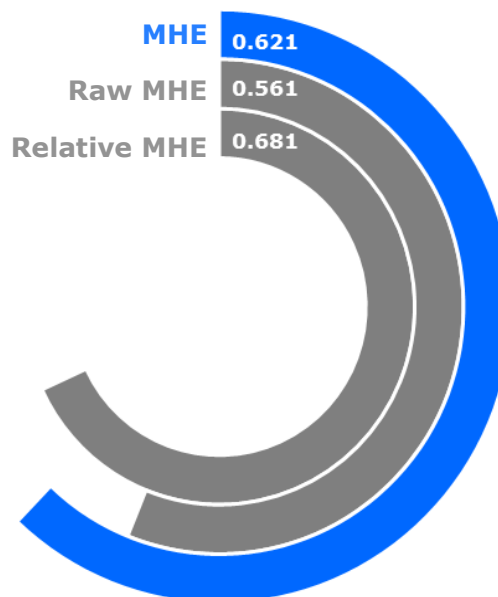
**18%**

**154,076 People**

### The Open-Air Market of Chichicastenango

Market day traditionally takes place on Thursdays and Sundays. The marketers come down from the mountains and from other villages to the central plaza between the church of Santo Tomas and the chapel of the Calvary to sell their goods in an impressive native market that has hardly changed over the centuries. The florists congregate on the steps of the church, and the streets are flanked by weavings, masks carved from wood, and pieces of pottery among other handicrafts.

[http://www.turansa.com/paginas/guatemala\\_departments/quiche.htm](http://www.turansa.com/paginas/guatemala_departments/quiche.htm)



<sup>13</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>14</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>15</sup> Rank: 4 of 22 Departments (Score: 0.587)** Vulnerability in Quiché is primarily driven by Information Access Vulnerability, Gender Inequality, and Economic Constraints. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

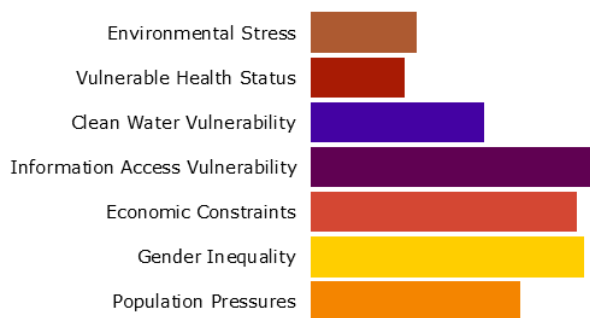









Table 11. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>35%</b> Province at Drought Risk	<b>0.68%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>25</b> Infant Mortality Rate	<b>113.4</b> Maternal Mortality Rate	<b>0.2%</b> Acute Malnutrition	<b>1.2%</b> Population Disabled	<b>7.6</b> TB Incidence	<b>2.6</b> Dengue Prevalence	<b>7.4</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>83.3%</b> Households with Access to Improved Water	<b>38.5%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>27.2%</b> Adult Illiteracy	<b>4.5</b> Average Years of Schooling	<b>71.8%</b> Primary School Enrollment	<b>4.7%</b> Households with Internet	<b>33.0%</b> Households with Cable TV	<b>69.8%</b> Households with Radio	<b>88.6%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>1.05</b> Economic Dependency Ratio	<b>74.7%</b> Population in Poverty	<b>0.50</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.11</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.24</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>5.1%</b> Average Annual Population Change	<b>1.1%</b> Average Annual Urban Population Change	<b>49.9%</b> Food Insecurity				

<sup>15</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>16</sup> Rank: 20 of 22 Departments (Score: 0.311)** Quiché displays a very low level of Coping Capacity, which is attributable to Economic Capacity and Transportation Infrastructure. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

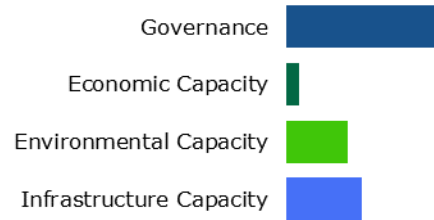


Table 122. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>69.9</b> Crime Victims per 100K	<b>18.6%</b> Households with Garbage Collection				
	<b>Economic Capacity</b>	<b>\$312.4</b> Remittances per Capita (USD)	<b>3.3</b> Businesses per 1,000 persons	<b>4,309.9</b> GDP per Capita (Quetzales)			
	<b>Environmental Capacity</b>	<b>6.3%</b> Protected Land	<b>0.9%</b> Reforested Area				
	<b>Infrastructure Capacity</b>						
	<b>Health Care Capacity</b>	<b>4.0</b> Hospital Beds per 10,000 Persons	<b>2.0</b> Nurses per 10,000 Persons	<b>2.2</b> Physicians per 10,000 Persons	<b>28.2 km</b> Average Distance to Nearest Hospital	<b>98.3%</b> Children Completed Immunization Schedule	
	<b>Communications Capacity</b>	<b>2.9%</b> Households with Access to Fixed Phone Line	<b>79.5%</b> Households with Access to Mobile Phone	<b>87.14%</b> Households with Access to Electricity			
	<b>Transportation Capacity</b>	<b>15.5 km</b> Average Distance to Nearest Port or Airport	<b>15.4 km</b> Total Length of Road per 100 km <sup>2</sup> (area)				

<sup>16</sup> Coping Capacity: The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>17</sup> Rank: 3 of 22 Departments (Score: 0.638)**

Quiché’s score and ranking are due to very high Vulnerability combined with very low Coping Capacity scores.

Table 13. The 3 Thematic areas with the weakest relative scores



**Information  
Access  
Vulnerability**



**Economic  
Capacity**



**Gender Inequality**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>18</sup> Rank: 1 of 22 Departments (Score: 0.632)**

Quiché’s score and ranking are due to moderate Multi-Hazard Exposure with very high Vulnerability and very low Coping Capacity scores.

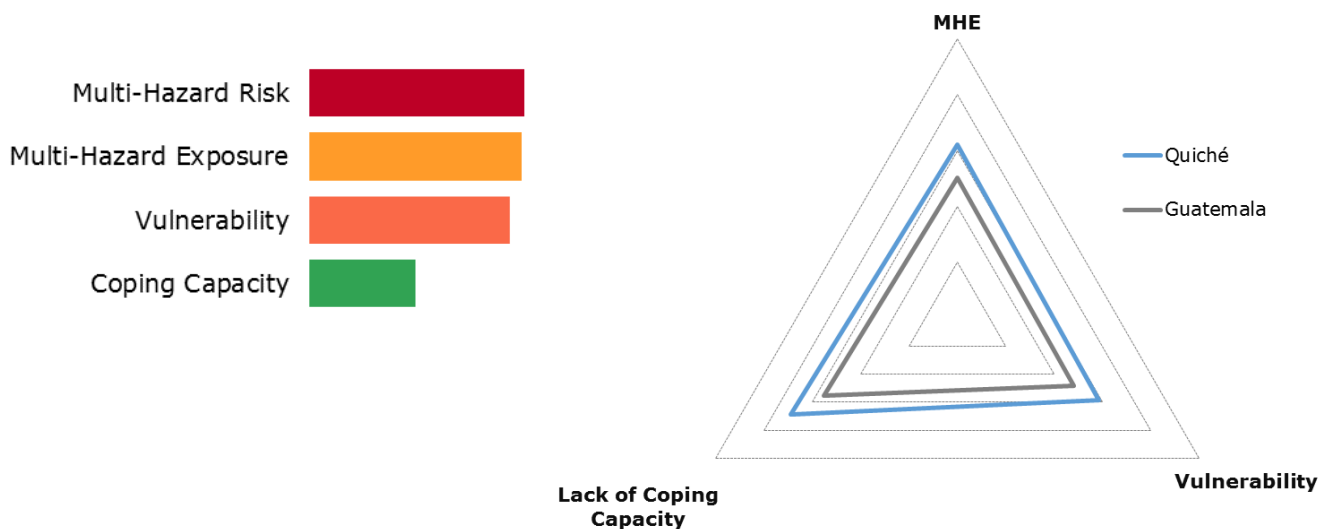


Figure 41. Department Multi-Hazard Risk Component scores compared to overall average country scores

<sup>17</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country’s normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>18</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country’s normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### **Low vulnerable health status**

Ranked 18 of 22 departments, low health vulnerability could indicate a population that will be more resilient to the negative health impacts associated with major disaster events.



### **High overall governance**

Ranked 5 of 22 departments, high governance could facilitate the implementation of disaster management initiatives into departmental and municipal communities.

## Recommendations

**01**

### **Increase business development**

Invest in business development and education programs to boost economic capacity and increase the number of businesses and the likelihood of success of those businesses.

**02**

### **Invest in communication infrastructure**

Invest in communication infrastructure to allow for easier access to information and education material, increasing literacy and situational awareness of the population.



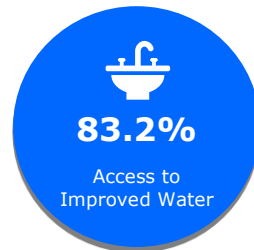
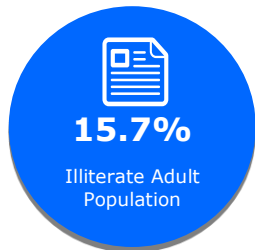
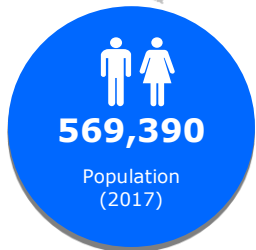
**Department: Totonicapán**



Department Capital: Totonicapán

Area: 1,061 km<sup>2</sup>

Totonicapán is located in the western highlands region of Guatemala and is known for its extensive highland oak-pine forests. Approximately 97% of the population identify as indigenous of Mayan descent.



**Municipality**

- Totonicapán
- Momostenango
- San Francisco el Alto
- Santa María Chiquimula
- San Andrés Xecul
- San Cristóbal Totonicapán
- Santa Lucía la Reforma
- San Bartolo

**Population**

- 152,893
- 149,840
- 75,771
- 54,997
- 42,101
- 41,306
- 27,217
- 25,263

**Multi-Hazard Risk Rank:  
Very High (2 of 22)**

**Lack of Resilience Rank:  
Very High (4 of 22)**



**RVA Component Scores**

Table 134. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Very High		Very High		High		Very High		Moderate	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.629	2	0.601	4	0.684	5	0.640	2	0.438	11

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>19</sup> Rank: 5 of 22 Departments (Score: 0.684)

Table 145. Estimated ambient population<sup>20</sup> exposed to each hazard



Cyclone

**100%**

**435,130 People**



Earthquake

**100%**

**435,130 People**



Volcano

**94%**

**410,304 People**



Flood

**5%**

**20,673 People**



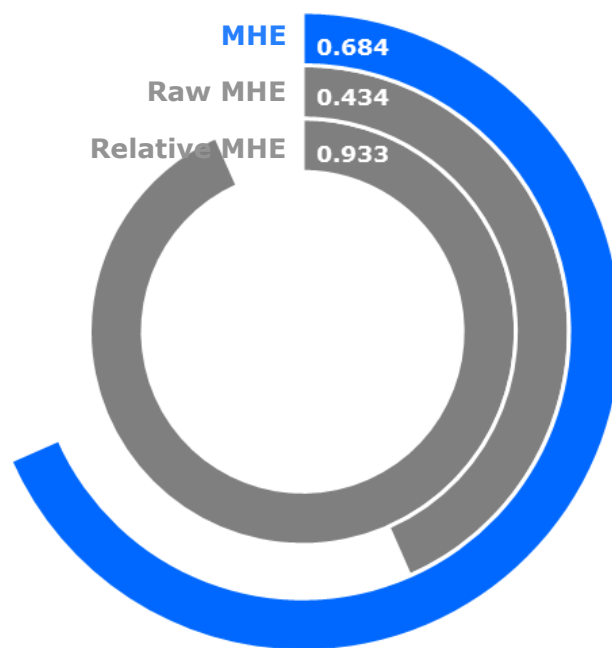
Landslide

**13%**

**55,892 People**

### Promoting Alternative Crops in Rural Communities of Totonicapán

In June 2016, the Inter-American Development Bank completed a project promoting alternative crop development in Guatemala. Traditionally, communities produced the same, uncompetitive crops, resulting in malnutrition and minimal income. The program, at a cost of just under \$750,000 USD, was designed to improve living conditions of small, rural agricultural communities in Guatemala.



<sup>19</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>20</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>21</sup> Rank: 2 of 22 Departments (Score: 0.64)** Vulnerability in Totonicapán is primarily driven by Information Access Vulnerability, Environmental Stress, and Economic Constraints. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

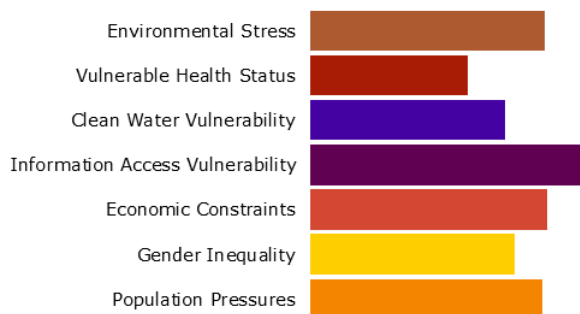









Table 16. Component scores for each vulnerability sub-component

	<b>Environmental Stress</b>	<b>99.9%</b> Province at Drought Risk	<b>-0.04%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>35</b> Infant Mortality Rate	<b>153.5</b> Maternal Mortality Ratio	<b>0.5%</b> Acute Malnutrition	<b>3.6%</b> Population Disabled	<b>2.6</b> TB Incidence	<b>8.2</b> Dengue Prevalence	<b>14.9</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>83.2%</b> Households with Access to Improved Water	<b>30.1%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>15.7%</b> Adult Illiteracy	<b>4.6</b> Average Years of Schooling	<b>62.7%</b> Primary School Enrollment	<b>2.0%</b> Households with Internet	<b>29.0%</b> Households with Cable TV	<b>78.9%</b> Households with Radio	<b>97.0%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>1.01</b> Economic Dependency Ratio	<b>77.5%</b> Population in Poverty	<b>0.45</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.004</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.28</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>4.5%</b> Average Annual Population Change	<b>3.15%</b> Average Annual Urban Population Change	<b>52.0%</b> Food Insecurity				

<sup>21</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>22</sup> Rank: 11 of 22 Departments (Score: 0.438)** Totonicapán displays a moderate level of Coping Capacity, which is attributable to low Economic Capacity and Transportation Infrastructure. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

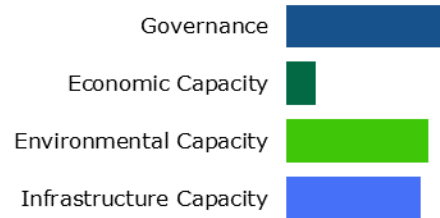


Table 15. Component Scores for each Coping Capacity Sub-component

	<b>Governance</b>	<b>70.7</b> Crime Victims per 100K	<b>14.4%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$255.3</b> Remittances per Capita (USD)	<b>6.71</b> Businesses per 1,000 persons	<b>6,255</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>12.32%</b> Protected Land	<b>3.17%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>1.07</b> Hospital Beds per 10,000 Persons	<b>1.87</b> Nurses per 10,000 Persons	<b>2.73</b> Physicians per 10,000 Persons	<b>33.2 Km</b> Average Distance to Nearest Hospital	<b>84.5%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>6.3%</b> Households with Access to Fixed Phone Line	<b>76.6%</b> Households with Access to Mobile Phone	<b>98.2%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>19.6 km</b> Average Distance to Nearest Port or Airport	<b>54.9 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>22</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>23</sup> Rank: 4 of 22 Departments (Score: 0.601)**

Totonicapán’s score and ranking are due to very high Vulnerability combined with moderate Coping Capacity scores.

Table 18. The 3 thematic areas with the weakest relative scores



**Information Access Vulnerability**



**Economic Capacity**



**Economic Constraints**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>24</sup> Rank: 2 of 22 Departments (Score: 0.629)**

Totonicapán’s score and ranking are due to high Multi-Hazard Exposure combined with very high Vulnerability and moderate Coping Capacity scores.

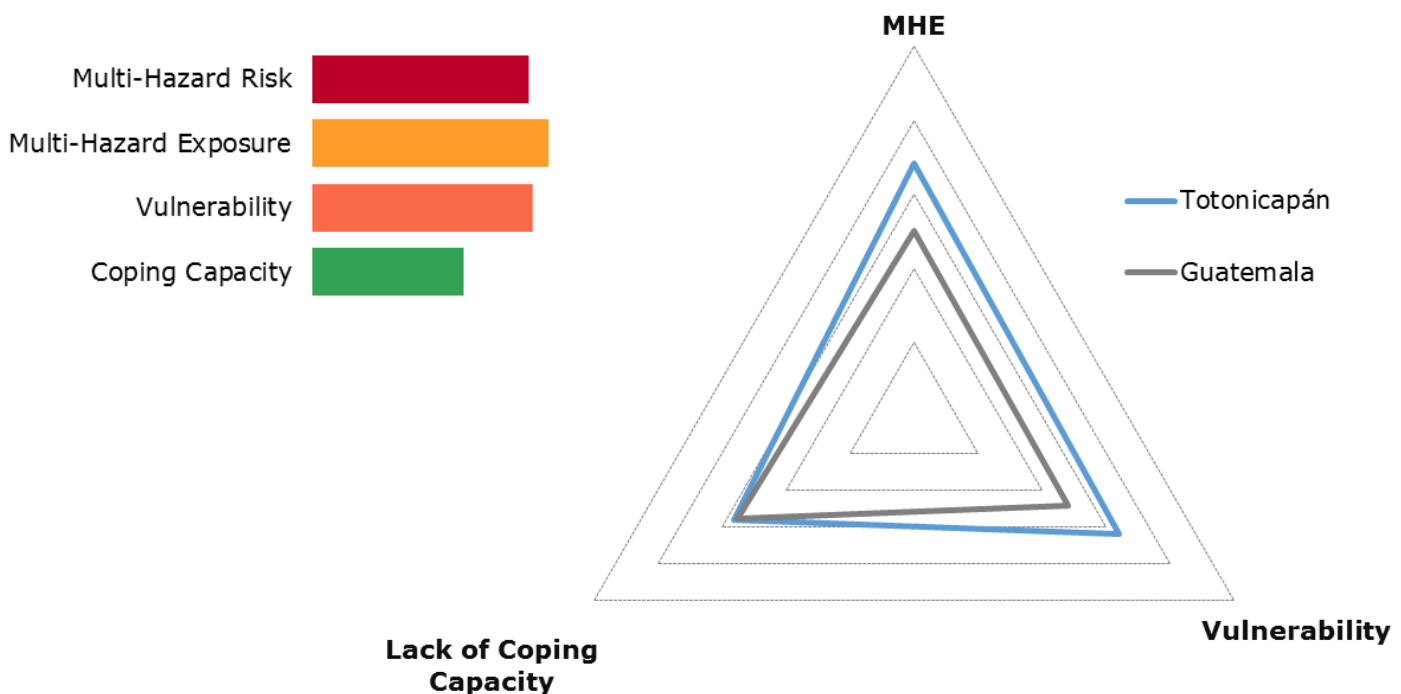


Figure 42. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>23</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country’s normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>24</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country’s normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### High overall governance

Ranked 4 of 22 departments, high governance could facilitate the implementation of disaster management initiatives into departmental and municipal communities.



### High transportation capacity

Ranked 4 of 22 departments, well developed transportation networks facilitate the movement of goods and services, decreasing wait times for response and relief supplies.

## Recommendations

01

### Invest in communication infrastructure

Invest in communication infrastructure to allow for easier access to disaster-related information and education material, increasing literacy and situational awareness of the population.

02

### Increase healthcare availability

Increase clinics and medical personnel through incentivized programs and investments to increase the health resilience of the population.

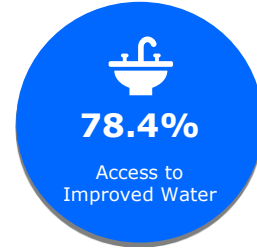
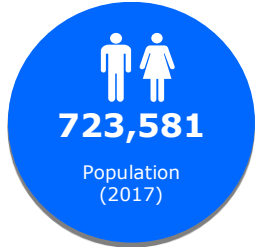
**Department: Chimaltenango**



Department Capital: Chimaltenango

Area: 1,979 km<sup>2</sup>

Chimaltenango is located in central Guatemala, immediately to the west of the departments of Sacatepéquez and Guatemala. The municipality of Tecpán in Chimaltenango is called the 'first capital of Guatemala,' as the first permanent Spanish colonial military center of the nation.



**Municipality**

Municipality	Population
Chimaltenango	152,919
Tecpán Guatemala	98,856
San Martín Jilotepeque	83,956
Patzún	58,106
Comalapa	47,104
Patzicía	39,645
San Andrés Itzapa	38,686
Yepocapa	36,126
El Tejar	30,176
Zaragoza	28,959
San José Poaquil	26,244
Acatenango	24,310
Parramos	19,323
Santa Apolonia	18,487
Pochuta	12,055
Santa Cruz Balanyá	8,627



**Multi-Hazard Risk Rank: Very High (3 of 22)**

**Lack of Resilience Rank: Very Low (11 of 22)**

**RVA Component Scores**

Table 19. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Very High		Moderate		Very High		Moderate		Moderate	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.586	3	0.518	11	0.722	2	0.441	13	0.405	14

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>25</sup> Rank: 2 of 22 Departments (Score: 0.722)

Table 16. Estimated ambient population<sup>26</sup> exposed to each hazard



Cyclone

**100%**

**580,970 People**



Earthquake

**100%**

**580,970 People**



Volcano

**100%**

**580,970 People**



Flood

**1%**

**3,004 People**



Landslide

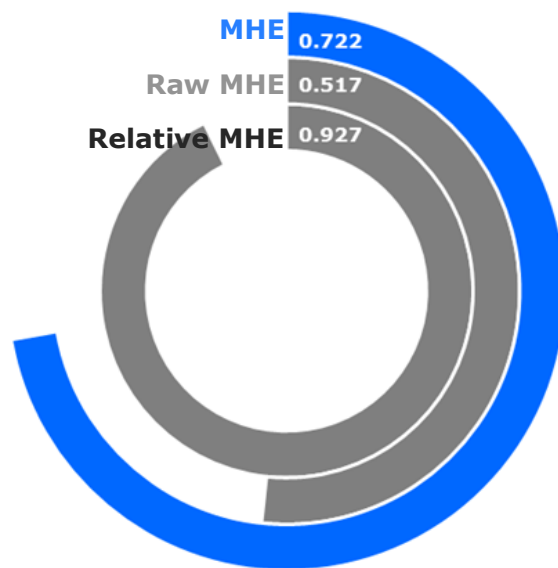
**10%**

**56,867 People**

### Pounds of Prevention

“After hurricanes Stan in 2005 and Mitch in 1998, USAID and its partners began a program to train staff to serve as liaisons to government officials, oversee risk-reduction projects, manage emergency shelters, coordinate with local police and fire departments, and plug into the wider national emergency-response system to ensure the effectiveness of all related investments. The municipal risk-management office coordinates the activities of 27 local disaster-management committees, one in each participating village in Tecpán. This knowledge and training helped save lives in May 2010 when Tropical Storm Agatha’s rains caused a landslide in the village of Giralda. Fortunately, no fatalities occurred because one active program participant heeded warning signs and evacuated his neighbors away from the steep slopes of the village in advance of the storm.”

USAID: *Pounds of Prevention – A Disaster Risk Reduction Story*



<sup>25</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>26</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.



## Vulnerability (V)

**Vulnerability<sup>27</sup> Rank: 13 of 22 Departments (Score: 0.441)** Vulnerability in Chimaltenango is primarily driven by Information Access Vulnerability and Economic Constraints. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

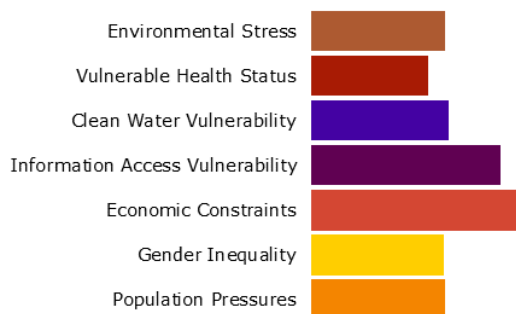









Table 171. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>47.2%</b> Province at Drought Risk	<b>.41%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>38</b> Infant Mortality Rate	<b>94.1</b> Maternal Mortality Ratio	<b>0.4%</b> Acute Malnutrition	<b>1.9%</b> Population Disabled	<b>3.0</b> TB Incidence	<b>3.6</b> Dengue Prevalence	<b>11.6</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>78.4%</b> Households with Access to Improved Water	<b>59.2%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>10.3%</b> Adult Illiteracy	<b>5.7</b> Average Years of Schooling	<b>72.3%</b> Primary School Enrollment	<b>5.7%</b> Households with Internet	<b>32.0%</b> Households with Cable TV	<b>87.0%</b> Households with Radio	<b>78.4%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.91</b> Economic Dependency Ratio	<b>66.1%</b> Population in Poverty	<b>0.51</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>20.0%</b> Female Seats in Congress	<b>0.06</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.10</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>4.1%</b> Average Annual Population Change	<b>2.2%</b> Average Annual Urban Population Change	<b>33.2%</b> Food Insecurity				

<sup>27</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>28</sup> Rank: 14 of 22 Departments (Score: 0.405)** Chimaltenango displays a medium level of Coping Capacity, which is attributable to low Economic Capacity and Healthcare Infrastructure. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

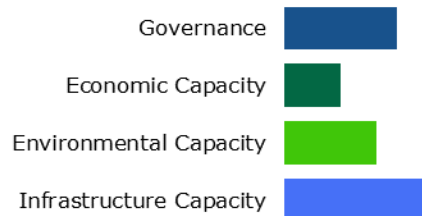









Table 182. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>165.1</b> Crime Victims per 100K	<b>17.0%</b> Households with Garbage Collection				
	<b>Economic Capacity</b>	<b>\$210.9</b> Remittances per Capita (USD)	<b>11.2</b> Businesses per 1,000 persons	<b>8,949.8</b> GDP per Capita (Quetzales)			
	<b>Environmental Capacity</b>	<b>10.6%</b> Protected Land	<b>1.4%</b> Reforested Area				
	<b>Infrastructure Capacity</b>						
	<b>Health Care Capacity</b>	<b>2.6</b> Hospital Beds per 10,000 Persons	<b>1.8</b> Nurses per 10,000 Persons	<b>2.3</b> Physicians per 10,000 Persons	<b>13.5 km</b> Average Distance to Nearest Hospital	<b>90.2%</b> Children Completed Immunization Schedule	
	<b>Communications Capacity</b>	<b>7.1%</b> Households with Access to Fixed Phone Line	<b>81.3%</b> Households with Access to Mobile Phone	<b>98.5%</b> Households with Access to Electricity			
	<b>Transportation Capacity</b>	<b>32.0 km</b> Average Distance to Nearest Port or Airport	<b>52.4 km</b> Total Length of Road per 100 km <sup>2</sup> (area)				

<sup>28</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>29</sup> Rank: 11 of 22 Departments (Score: 0.518)**

Chimaltenango's score and ranking are due to moderate Vulnerability and Coping Capacity scores.

Table 23. The 3 thematic areas with the weakest relative scores



**Health Care Capacity**



**Economic Capacity**



**Economic Constraints**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>30</sup> Rank: 3 of 22 Departments (Score: 0.586)**

Chimaltenango's score and ranking are due to very high Multi-Hazard Exposure combined with moderate Vulnerability and Coping Capacity scores.

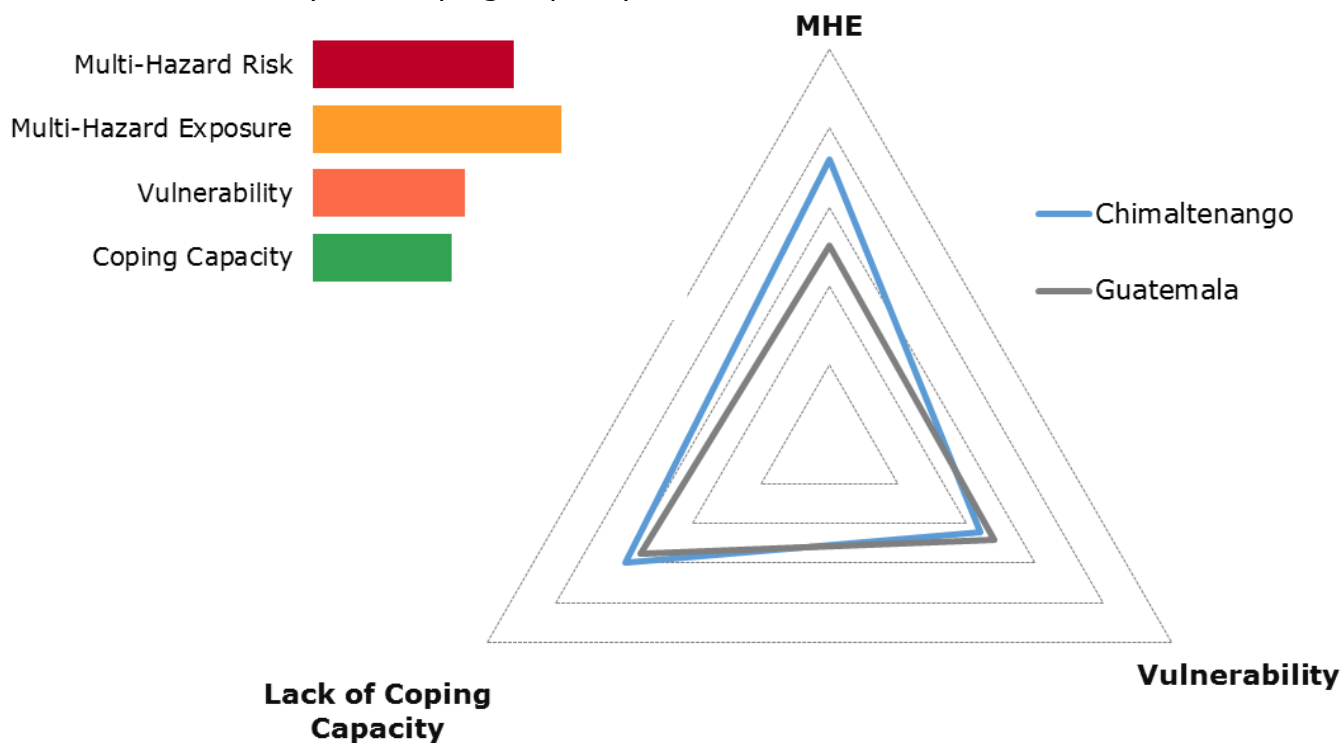


Figure 43. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>29</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>30</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### **Low vulnerable health status**

Ranked 20 of 22 departments, low health vulnerability indicates a population that will be more resilient to the negative health impacts associated with major disaster events.



### **Low gender inequality**

Ranked 18 of 22 departments, low gender inequality indicates that vulnerable populations are more likely to have their needs met under 'normal' conditions and may be less susceptible during times of disaster.



### **High transportation capacity**

Ranked 1 of 22 departments, well developed transportation networks facilitate the movement of goods and services, decreasing wait times for response and relief supplies.

## Recommendations

**01**

### **Increase economic capacity**

Encourage business development and education programs to increase economic opportunities in the region.

**02**

### **Increase health care availability**

Increase clinics and medical personnel through incentivized programs and investments to increase the health resilience of the population.

**Department: Alta Verapaz**



Department Capital: Cobán

Area: 8,686 km<sup>2</sup>

Alta Verapaz is located in north central Guatemala, just south of Petén. The department is one of the main palm oil export areas in the country and Central America. Alta Verapaz has the highest poverty rate in the country.



**Municipality**

- Cobán
- San Pedro Carchá
- Chisec
- Fray Bartolomé de las Casas
- Senahú
- San Cristóbal Verapaz
- Cahabon
- San Juan Chamelco
- Panzós
- Santa Cruz Verapaz
- Tucurú
- La Tinta
- Tactic
- Raxruhá
- Chahal
- Lanquín
- Tamahú

**Population**

- 279,372
- 257,136
- 77,656
- 73,879
- 72,268
- 68,867
- 67,745
- 67,223
- 66,041
- 47,808
- 47,705
- 44,089
- 40,235
- 38,735
- 31,107
- 28,587
- 23,877



**Multi-Hazard Risk Rank: Very High (4 of 22)**

**Lack of Resilience Rank: Very High (1 of 22)**

**RVA Component Scores**

Table 24. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Very High		Very High		Low		Very High		Very Low	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.583	4	0.698	1	0.353	18	0.707	1	0.311	21

## Multi-Hazard Exposure (MHE)

**Multi-Hazard Exposure<sup>31</sup> Rank: 18 of 22 Departments (Score: 0.353)**

Table 195. Estimated ambient population<sup>32</sup> exposed to each hazard



Cyclone

**0%**

**0 People**



Earthquake

**100%**

**1,012,801 People**



Volcano

**16%**

**157,122 People**



Flood

**17%**

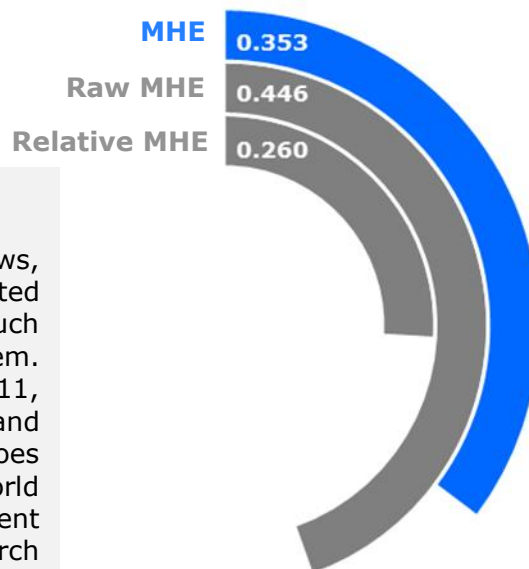
**174,066 People**



Landslide

**7%**

**69,332 People**



### Gender Inequality

“Despite existing relevant international and national laws, discrimination against women is a common, deep-rooted issue especially in poor, rural, indigenous communities such as Alta Verapaz with a heavy-handed patriarchal system. Femicide is the most extreme, yet continual, result. In 2011, 20,389 cases of physical, sexual, psychological, and economical violence and femicide were reported; this does not include the many cases that are not reported. World Renew trained 150 participants from five different communities. These participants are respected church members from impacted communities of gender injustice. Training and activities include: Developing a process of sensitization around gender equality; Awareness and training of men and women about the issues of gender rights; Educating leaders and local authorities.”

<https://worldrenew.net/what-we-do/projects/gender-justice-guatemala>

<sup>31</sup> **Multi-Hazard Exposure:** Average exposure of the population to hazards.

<sup>32</sup> **Ambient Population:** 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>33</sup> Rank: 1 of 22 Departments (Score: 0.707)** Vulnerability in Alta Verapaz is primarily driven by Clean Water Vulnerability, Population Pressures, Gender Inequality and Information Access Vulnerability. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

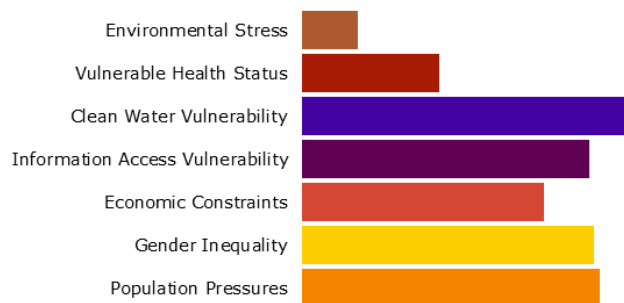









Table 26. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>0.4%</b> Province at Drought Risk	<b>0.2%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>29</b> Infant Mortality Rate	<b>186.0</b> Maternal Mortality Ratio	<b>0.7%</b> Acute Malnutrition	<b>1.0%</b> Population Disabled	<b>8.3</b> TB Incidence	<b>4.3</b> Dengue Prevalence	<b>6.4</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>44.1%</b> Households with Access to Improved Water	<b>21.4%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>25.9%</b> Adult Illiteracy	<b>4.0</b> Average Years of Schooling	<b>77.9%</b> Primary School Enrollment	<b>2.0%</b> Households with Internet	<b>14.1%</b> Households with Cable TV	<b>70.8%</b> Households with Radio	<b>89.7%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.91</b> Economic Dependency Ratio	<b>83.1%</b> Population in Poverty	<b>0.50</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>11.1%</b> Female Seats in Congress	<b>0.26</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.31</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>0.4%</b> Province at Drought Risk	<b>0.2%</b> Annual Forest Change					

<sup>33</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>34</sup> Rank: 21 of 22 Departments (Score: 0.311)** Alta Verapaz displays a very low level of Coping Capacity, which is attributable to very low Economic Capacity and Infrastructure Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Coping Capacity score.

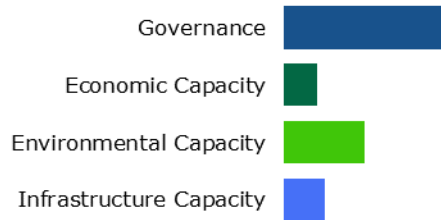


Table 20. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>122.2</b> Crime Victims per 100K	<b>7.3%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$306.0</b> Remittances per Capita (USD)	<b>6.04</b> Businesses per 1,000 persons	<b>6,255</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>6.4%</b> Protected Land	<b>1.6%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>13.9</b> Hospital Beds per 10,000 Persons	<b>1.3</b> Nurses per 10,000 Persons	<b>1.5</b> Physicians per 10,000 Persons	<b>27.4 km</b> Average Distance to Nearest Hospital	<b>86.9%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>3.14%</b> Households with Access to Fixed Phone Line	<b>81.6%</b> Households with Access to Mobile Phone	<b>44.1%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>23.6 km</b> Average Distance to Nearest Port or Airport	<b>9.1 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>34</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.



## Lack of Resilience (LR)

**Lack of Resilience<sup>35</sup> Rank: 1 of 22 Departments (Score: 0.698)**

Alta Verapaz's score and ranking are due to very high Vulnerability combined with very low Coping Capacity scores.

Table 2821. The 3 thematic areas with the weakest relative scores



**Infrastructure Capacity**



**Economic Capacity**



**Clean Water Vulnerability**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>36</sup> Rank: 4 of 22 Departments (Score: 0.583)**

Alta Verapaz's score and ranking are due to very high Vulnerability, low Multi-Hazard Exposure combined with very low Coping Capacity scores.

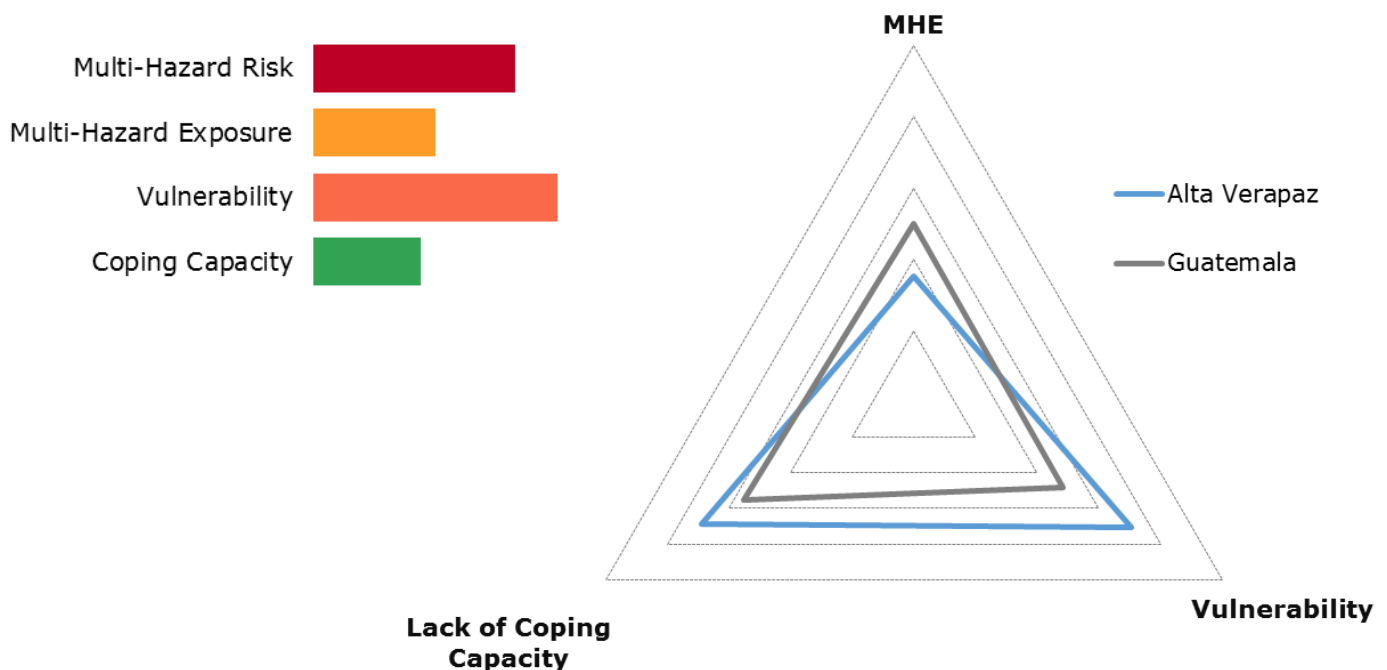


Figure 44. Department Multi-Hazard Risk Component scores compared to overall average country scores

<sup>35</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>36</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### **Lowest environmental stress**

Ranked 22 of 22 departments, low environmental stress indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.



### **High overall governance**

Ranked 3 of 22 departments, high governance could facilitate the implementation of disaster management initiatives into departmental and municipal communities.

## Recommendations

**01**

### **Invest in infrastructure**

Invest in Health Care, Transportation and Communication Infrastructures to increase coping capacity and resiliency within the department.

**02**

### **Increase water and sanitation services**

Invest in public water and waste facilities to increase water quality and access and reduce the spread of disease.

**03**

### **Provide opportunities for women**

Public education and awareness programs that focus on increasing the role of women in the workplace and the society will improve the resilience of women during disasters.

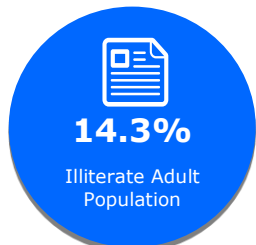
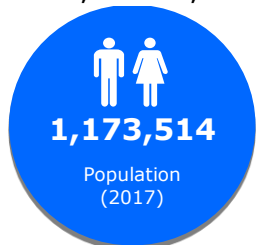
**Department: San Marcos**



Department Capital: San Marcos

Area: 2,397 km<sup>2</sup>

San Marcos is located in northwest Guatemala, bordering the Pacific Ocean to the west and Mexico to the north. The extreme range in altitude from the coast to the Tajumulco volcano – the highest peak in Central America – results in a large variety of crops, including apples, bananas, beans, cacao, coffee, maize, oats, plantains, rice, and potatoes.



**Municipality**

Malacatán	123,926
Tacaná	83,988
San Pedro Sacatepéquez	74,611
Comitancillo	70,758
Tajumulco	64,880
Concepción Tutuapa	63,454
San Pablo	61,765
San Marcos	60,383
Ocós	50,835
El Tumbador	44,667
Ayutla	43,602
Nuevo Progreso	42,498
Catarina	40,165
San Miguel Ixtahuacán	39,997
Tejutla	35,827
Ixchiguán	33,372
Pajapita	28,545
El Quetzal	25,697
San Antonio Sacatepéquez	23,055
San José Ojetenam	21,398
Sipacapa	20,588
El Rodeo	18,395
San Cristóbal Cucho	18,013
Sibinal	17,750
San Rafael Pie de La Cuesta	16,986
La Reforma	15,944

**Population**

123,926
83,988
74,611
70,758
64,880
63,454
61,765
60,383
50,835
44,667
43,602
42,498
40,165
39,997
35,827
33,372
28,545
25,697
23,055
21,398
20,588
18,395
18,013
17,750
16,986
15,944



**Multi-Hazard Risk Rank: High (5 of 22)**      **Lack of Resilience Rank: High (7 of 22)**

**RVA Component Scores**

Table 229. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
High		High		Moderate		High		Low	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.576	5	0.565	7	0.598	10	0.519	8	0.389	18

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>37</sup> Rank: 10 of 22 Departments (Score: 0.598)

Table 3023. Estimated ambient population<sup>38</sup> exposed to each hazard



Cyclone

**100%**

**1,041,378 People**



Earthquake

**100%**

**1,041,378 People**



Volcano

**1.6%**

**16,662 People**



Flood

**8%**

**79,607 People**



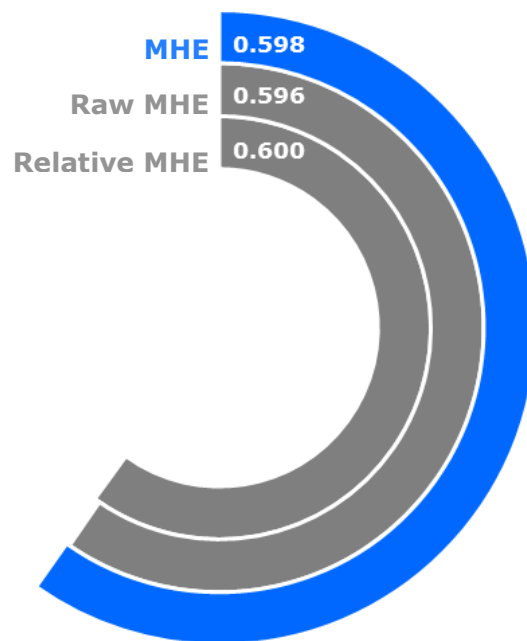
Landslide

**17%**

**180,963 People**

### Magnitude 7.4 Earthquake

In November 2012, a 7.4M earthquake struck off the coast of Guatemala, causing shaking as far away as Mexico City and San Salvador. In San Marcos, one of the hardest hit areas, over 30 houses collapsed, communications were severed, and landslides blocked main transportation routes in and out of the town. Additionally, a school collapsed, injuring eight people. It was the worst earthquake to hit Guatemala since 1976.



<sup>37</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>38</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>39</sup> Rank: 8 of 22 Departments (Score: 0.519)** Vulnerability in San Marcos is primarily driven by Economic Constraints, Clean Water Access Vulnerability, and Gender Inequality. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

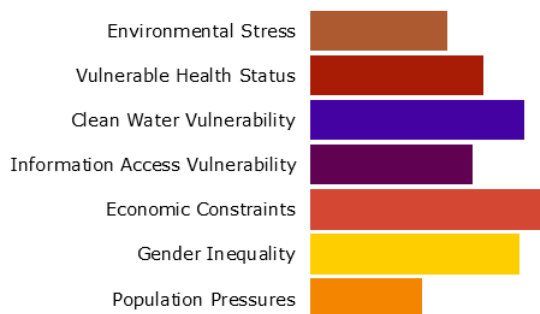









Table 241. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>42.0%</b> Province at Drought Risk	<b>-0.16%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>29</b> Infant Mortality Rate	<b>157.9</b> Maternal Mortality Ratio	<b>0.7%</b> Acute Malnutrition	<b>1.2%</b> Population Disabled	<b>22.4</b> TB Incidence	<b>17.5</b> Dengue Prevalence	<b>7.0</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>73%</b> Households with Access to Improved Water	<b>35.6%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>14.3%</b> Adult Illiteracy	<b>5.0</b> Average Years of Schooling	<b>87.4%</b> Primary School Enrollment	<b>4.4%</b> Households with Internet	<b>26.0%</b> Households with Cable TV	<b>77.5%</b> Households with Radio	<b>30.3%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.81</b> Economic Dependency Ratio	<b>60.2%</b> Population in Poverty	<b>0.61</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>11.1%</b> Female Seats in Congress	<b>.537</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.196</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>3.2%</b> Average Annual Population Change	<b>2.21%</b> Average Annual Urban Population Change	<b>35.4%</b> Food Insecurity				

<sup>39</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>40</sup> Rank: 18 of 22 Departments (Score: 0.389)** San Marcos displays a low level of Coping Capacity, which is attributable to Economic Capacity and Environmental Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

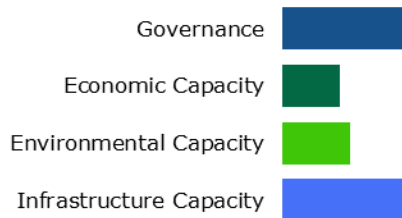


Table 252. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>96.8</b> Crime Victims per 100K	<b>11.8%</b> Households with Garbage Collection				
	<b>Economic Capacity</b>	<b>\$523.1</b> Remittances per Capita (USD)	<b>5.7</b> Businesses per 1,000 Persons	<b>6,282</b> GDP per Capita (Quetzales)			
	<b>Environmental Capacity</b>	<b>3.6%</b> Protected Land	<b>1.7%</b> Reforested Area				
	<b>Infrastructure Capacity</b>						
	<b>Health Care Capacity</b>	<b>13.9</b> Hospital Beds per 10,000 Persons	<b>2.3</b> Nurses per 10,000 Persons	<b>2.9</b> Physicians per 10,000 Persons	<b>20.4 km</b> Average Distance to Nearest Hospital	<b>91.7%</b> Children Completed Immunization Schedule	
	<b>Communications Capacity</b>	<b>7.0%</b> Households with Access to Fixed Phone Line	<b>75.6%</b> Households with Access to Mobile Phone	<b>96.4%</b> Households with Access to Electricity			
	<b>Transportation Capacity</b>	<b>22.6 km</b> Average Distance to Nearest Port or Airport	<b>33.9 km</b> Total Length of Road per 100 km <sup>2</sup> (area)				

<sup>40</sup> Coping Capacity: The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>41</sup> Rank: 7 of 22 Departments (Score: 0.565)**

San Marcos' score and ranking are due to high Vulnerability combined with low Coping Capacity scores.

Table 263. The 3 thematic areas with the weakest relative scores



**Economic Constraints**



**Economic Capacity**



**Clean Water Vulnerability**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>42</sup> Rank: 5 of 22 Departments (Score: 0.576)**

San Marcos' score and ranking are due to high Vulnerability, moderate Multi-Hazard Exposure combined with low Coping Capacity scores.

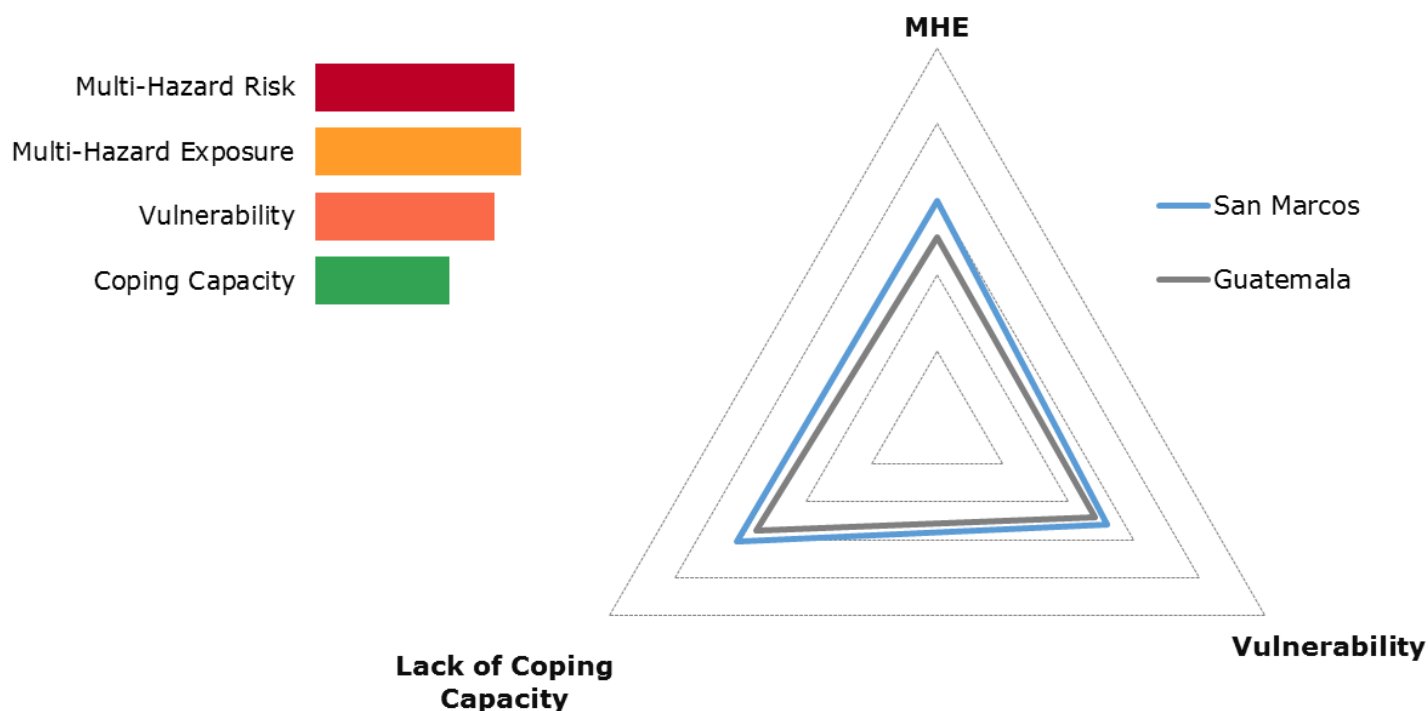


Figure 45. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>41</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>42</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Low population pressures

Ranked 16 of 22 departments, limited population change allows disaster managers to form accurate evacuation, sheltering, and resource plans.

## Recommendations

01

### Invest in business development

Provide education and opportunities for business development, increasing economic capacity.

02

### Increase water and sanitation services

Invest in public water and waste facilities to increase water quality and access and reduce the spread of disease.



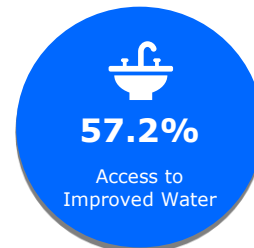
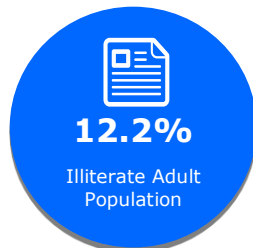
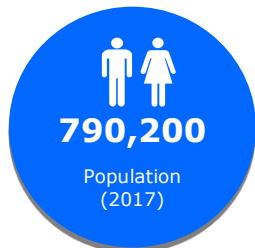
**Department: Escuintla**



Department Capital: Escuintla

Area: 4,384 km<sup>2</sup>

Escuintla is located in southern Guatemala, south of Guatemala City. Escuintla borders the Pacific Ocean to the south and has the country's longest maritime border. The major products are sugar cane, cattle, seafood, and tobacco. Escuintla produces over 40% of the country's Gross Domestic Product.



**Municipality**

- Escuintla
- Santa Lucía Cotzumalguapa
- Palín
- La Gomera
- Nueva Concepción
- Tiquizate
- San José
- Masagua
- La Democracia
- Siquinalá
- Guanagazapa
- San Vicente Pacaya
- Iztapa

**Population**

- 165,922
- 149,043
- 72,676
- 64,931
- 63,806
- 62,411
- 55,611
- 50,340
- 28,445
- 26,895
- 19,337
- 18,859
- 11,922



**Multi-Hazard Risk Rank: High (6 of 22)**

**Lack of Resilience Rank: Moderate (12 of 22)**

**RVA Component Scores**

Table 274. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
High		Moderate		High		Low		Low	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.563	6	0.508	12	0.674	7	0.412	17	0.397	16

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>43</sup> Rank: 7 of 22 Departments (Score: 0.674)

Table 285. Estimated ambient population<sup>44</sup> exposed to each hazard



Cyclone

**100%**

**705,665 People**



Earthquake

**100%**

**705,665 People**



Volcano

**40%**

**283,563 People**



Flood

**38%**

**269,566 People**



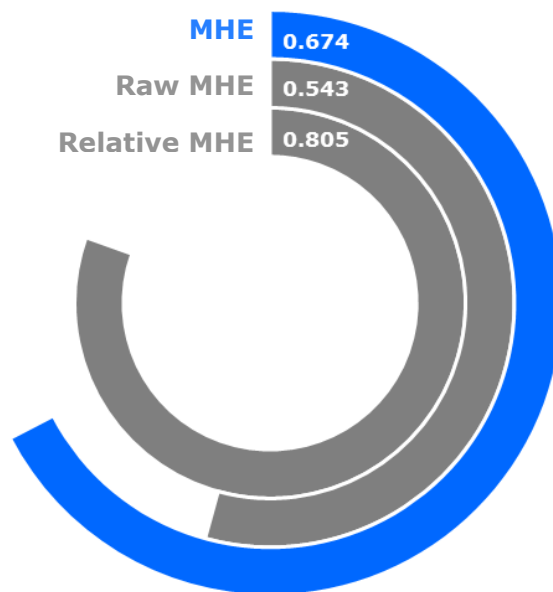
Landslide

**1%**

**3,946 People**

### USSOUTHCOM-Built EOC and Warehouse

United States Southern Command, in cooperation with CONRED, recently financed and built a new EOC and storage warehouse in Escuintla Department using Humanitarian Assistance Program funds. The structure, consisting of offices, a small room EOC, and thousands of square feet of warehouse space, is occupied daily by personnel from la Coordinadora Departamental para la Reducción de Desastres (CODRED) for Escuintla.



<sup>43</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>44</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>45</sup> Rank: 17 of 22 Departments (Score: 0.412)** Vulnerability in Escuintla is primarily driven by Vulnerable Health Status and Clean Water Vulnerability. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

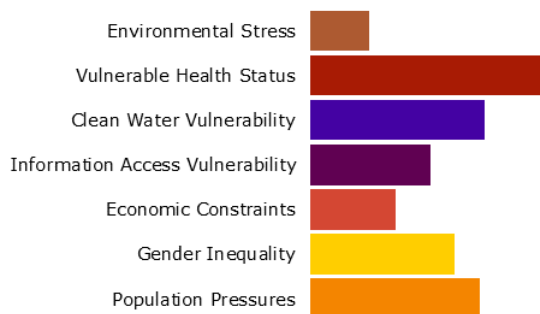









Table 29. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>27.2%</b> Province at Drought Risk	<b>2.1%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>26</b> Infant Mortality Rate	<b>229.3</b> Maternal Mortality Ratio	<b>1.1%</b> Acute Malnutrition	<b>3.4%</b> Population Disabled	<b>56.0</b> TB Incidence	<b>33.2</b> Dengue Prevalence	<b>10.2</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>57.2%</b> Households with Access to Improved Water	<b>71.8%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>12.2%</b> Adult Illiteracy	<b>5.7</b> Average Years of Schooling	<b>87.1%</b> Primary School Enrollment	<b>3.4%</b> Households with Internet	<b>48.6%</b> Households with Cable TV	<b>78.0%</b> Households with Radio	<b>7.4%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.67</b> Economic Dependency Ratio	<b>52.9%</b> Population in Poverty	<b>0.42</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>16.7%</b> Female Seats in Congress	<b>0.02</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.20</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>3.2%</b> Average Annual Population Change	<b>2.6%</b> Average Annual Urban Population Change	<b>48.6%</b> Food Insecurity				

<sup>45</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>46</sup> Rank: 16 of 22 Departments (Score: 0.397)** Escuintla displays a low level of Coping Capacity, which is attributable to low Governance and Environmental Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

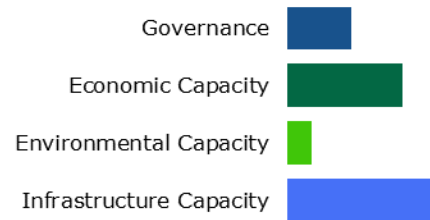


Table 30. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>566.1</b> Crime Victims per 100K	<b>17.0%</b> Households with Garbage Collection				
	<b>Economic Capacity</b>	<b>\$454.7</b> Remittances per Capita (USD)	<b>13 .0</b> Businesses per 1,000 Persons	<b>13,414</b> GDP per Capita (Quetzales)			
	<b>Environmental Capacity</b>	<b>1.9%</b> Protected Land	<b>0.7%</b> Reforested Area				
	<b>Infrastructure Capacity</b>						
	<b>Health Care Capacity</b>	<b>4.6</b> Hospital Beds per 10,000 Persons	<b>8.7</b> Nurses per 10,000 Persons	<b>6.8</b> Physicians per 10,000 Persons	<b>25.1 km</b> Average Distance to Nearest Hospital	<b>91.5%</b> Children Completed Immunization Schedule	
	<b>Communications Capacity</b>	<b>6.5%</b> Households with Access to Fixed Phone Line	<b>87.8%</b> Households with Access to Mobile Phone	<b>97.0%</b> Households with Access to Electricity			
	<b>Transportation Capacity</b>	<b>35.0 km</b> Average Distance to Nearest Port or Airport	<b>20.6 km</b> Total Length of Road per 100 km <sup>2</sup> (area)				

<sup>46</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>47</sup> Rank: 12 of 22 Departments (Score: 0.508)**

Escuintla’s score and ranking are due to low Vulnerability combined with low Coping Capacity scores.

Table 31. The 3 thematic areas with the weakest relative scores



**Vulnerable Health Status**



**Environmental Capacity**



**Clean Water Vulnerability**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>48</sup> Rank: 6 of 22 Departments (Score: 0.563)**

Escuintla’s score and ranking are due to low Vulnerability, high Multi-Hazard Exposure combined with low Coping Capacity scores.

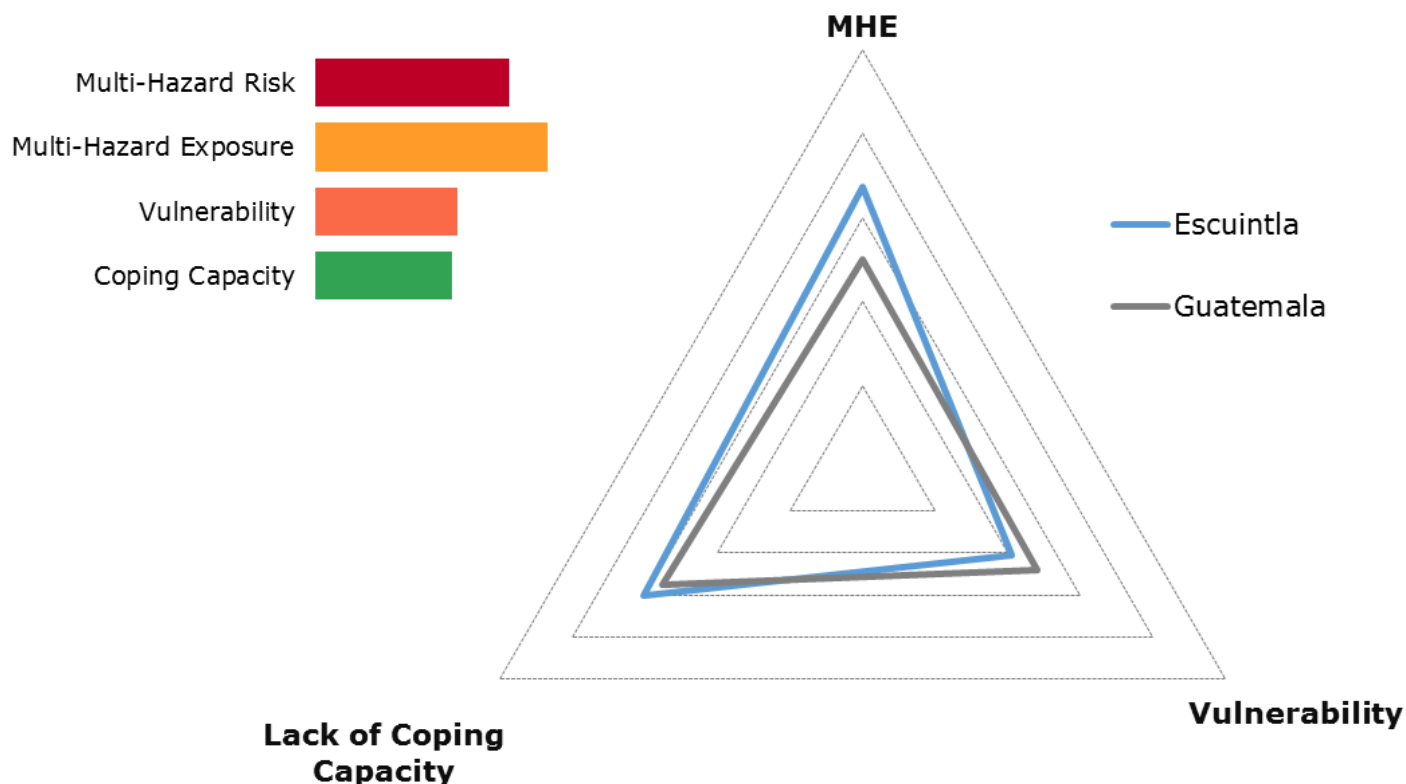


Figure 46. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>47</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country’s normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>48</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country’s normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Low economic constraints

Ranked 21 of 22 departments, low economic constraints indicate that Escuintla may be able to invest in additional mitigation and preparedness measures at the local and community level.



### Low gender inequality

Ranked 21 of 22 departments, low gender inequality indicates that vulnerable populations are more likely to have their needs met under 'normal' conditions and may be less susceptible during times of disaster.



### High overall infrastructure capacity

Ranked 4 of 22 departments, well developed infrastructure – communication, health care, transportation - facilitates the exchange of information, and physical distribution of goods and services to the population.

## Recommendations

01

### Increase environmental programs

Invest in programs to provide protection for the environment, including protected lands and reforestation projects, to increase the ability of the environment to recover after a disaster.

02

### Invest in family and child services

Provide early health education programs and access to health care, especially for new mothers and infants to increase resilience to injury, disease, and stress associated with disasters.

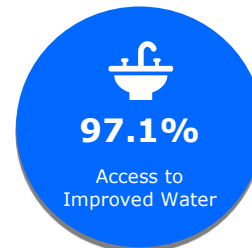
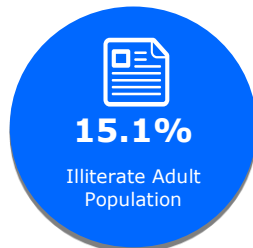
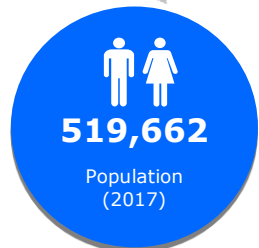
## Department: Sololá



Department Capital: Sololá

Area: 1,061 km<sup>2</sup>

Sololá is located in western Guatemala. Lake Atitlán, known as one of the most beautiful lakes in the world, is located in the department and is Guatemala's most popular tourist attraction.



### Municipality

Sololá	149,951
Nahualá	71,785
Santa Catalina Ixtahuacán	53,322
Santiago Atitlán	52,046
San Lucas Tolimán	33,986
Santa Lucía Utatlán	26,944
Panajachel	20,387
San Andres Semetabaj	14,649
San Antonio Palopó	14,289
San Juan La Laguna	12,247
San Pedro La Laguna	12,210
Santa Clara La Laguna	11,189
Santa Cruz La Laguna	9,027
San Pablo La Laguna	8,174
Concepción	7,809
Santa Catarina Palopó	7,363
San José Chacayá	5,871
San Marcos La Laguna	5,546
Santa María Visitación	2,868

### Population

Sololá	149,951
Nahualá	71,785
Santa Catalina Ixtahuacán	53,322
Santiago Atitlán	52,046
San Lucas Tolimán	33,986
Santa Lucía Utatlán	26,944
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Concepción	7,809
Santa Catarina Palopó	7,363
San José Chacayá	5,871
San Marcos La Laguna	5,546
Santa María Visitación	2,868



- 1) SANTA MARÍA VISITACIÓN
- 2) SANTA CLARALA LAGUNA
- 3) SANTA PABLO LA LAGUNA
- 4) SANTA MARCOS LA LAGUNA
- 5) SANTA CRUZ LA LAGUNA
- 6) SAN JOSÉ CHACAYÁ
- 7) PANAJACHEL
- 8) SANTA CATARIN PALAPÓ

**Multi-Hazard Risk Rank:  
High (7 of 22)**

**Lack of Resilience Rank:  
Low (17 of 22)**

## RVA Component Scores

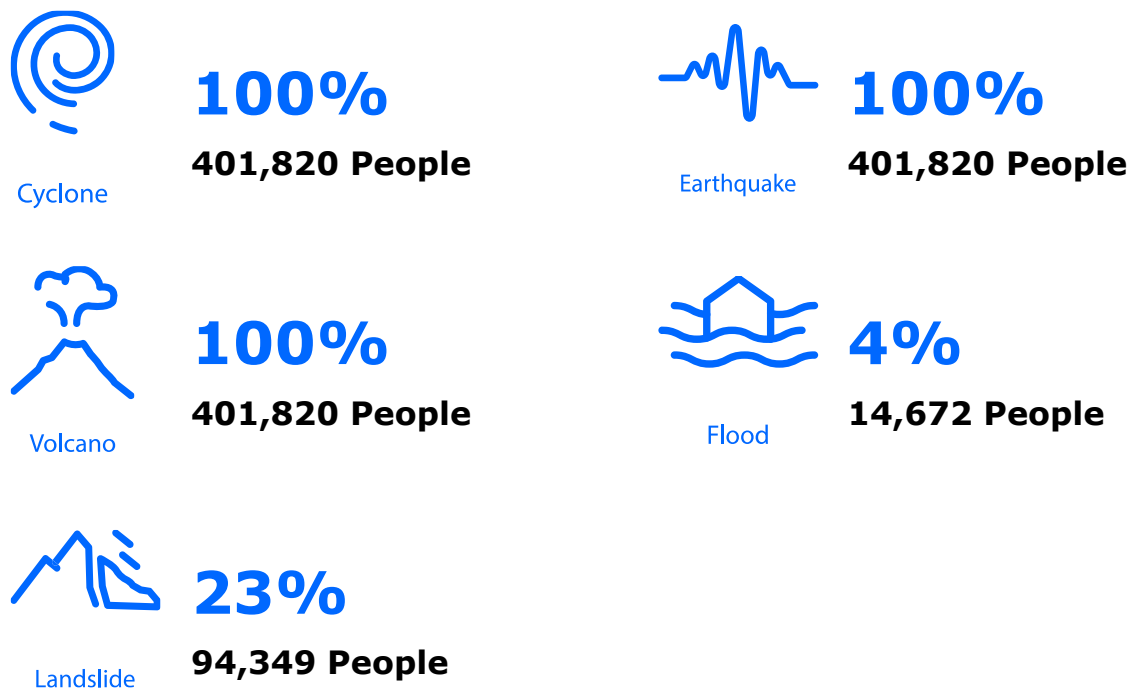
Table 32. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
High		Low		Very High		Moderate		High	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.560	7	0.486	17	0.709	3	0.488	10	0.515	6

## Multi-Hazard Exposure (MHE)

**Multi-Hazard Exposure<sup>49</sup> Rank: 3 of 22 Departments (Score: 0.709)**

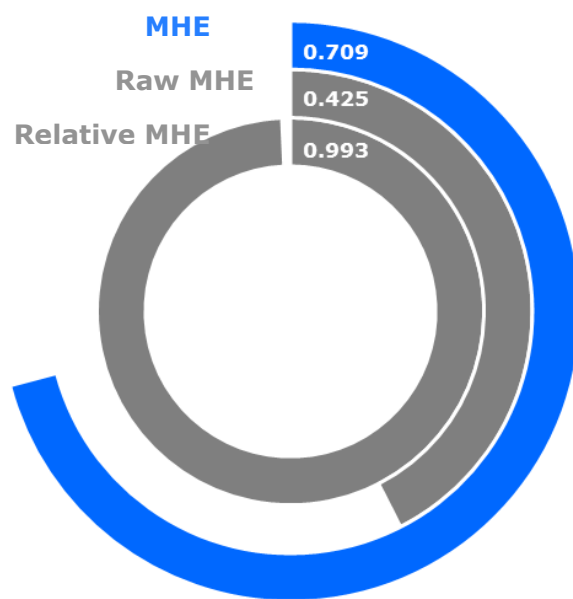
Table 40. Estimated ambient population<sup>50</sup> exposed to each hazard



Trócaire began working with AMI (Integrated Medical Attention) San Lucas, a local NGO based in the department of Sololá, in 2009 on disaster preparedness and response in one of Guatemala’s most high-risk regions. The communities of Sololá have endured multiple natural disasters, including Hurricane Stan in 2005, Ágata in 2010, the 12A storm of 2011, and the earthquake of November 2012, which caused massive landslides and the destruction of many homes.

Trócaire and AMI San Lucas have supported the community of Paquip, Sololá, in the formation, training, and accreditation of its COLRED (Local Coordinator for the Reduction of Disasters). The COLRED has 10 members, three of whom are women. Each member has a specific responsibility, for example: coordinator of the refuge, first aid, search and rescue leader. Members have participated in first aid and search and rescue trainings, and have been provided with equipment, such as helmets, radios, flashlights, a stretcher, and first-aid kits.

<https://www.trocaire.org/sites/default/files/pdfs/whatwedo/trocaire-guatemala-disaster-risk-reduction.pdf>



<sup>49</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>50</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.



## Vulnerability (V)

**Vulnerability<sup>51</sup> Rank: 10 of 22 Departments (Score: 0.488)** Vulnerability in Sololá is primarily driven by Information Access Vulnerability and Population Pressures. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

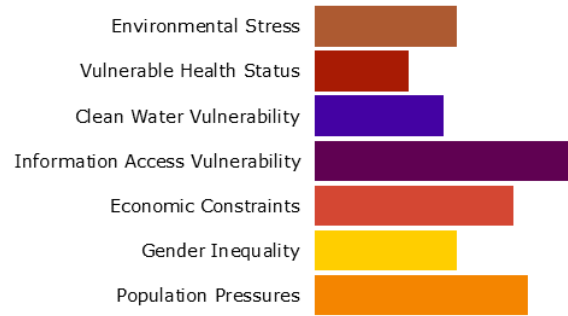









Table 331. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>44.1%</b> Province at Drought Risk	<b>-0.2%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>22</b> Infant Mortality Rate	<b>21.1</b> Maternal Mortality Ratio	<b>0.0%</b> Acute Malnutrition	<b>5.7%</b> Population Disabled	<b>5.4</b> TB Incidence	<b>4.4</b> Dengue Prevalence	<b>16.2</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>97.1%</b> Households with Access to Improved Water	<b>38.4%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>15.1%</b> Adult Illiteracy	<b>4.8</b> Average Years of Schooling	<b>66.8%</b> Primary School Enrollment	<b>3.4%</b> Households with Internet	<b>46.7%</b> Households with Cable TV	<b>75.8%</b> Households with Radio	<b>96.5%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.94</b> Economic Dependency Ratio	<b>80.9%</b> Population in Poverty	<b>0.40</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.04</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.03</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>4.6%</b> Average Annual Population Change	<b>0.9%</b> Average Annual Urban Population Change	<b>54.9%</b> Food Insecurity				

<sup>51</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>52</sup> Rank: 6 of 22 Departments (Score: 0.515)** Sololá displays a high level of Coping Capacity, which is attributable to high Governance and Environmental Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

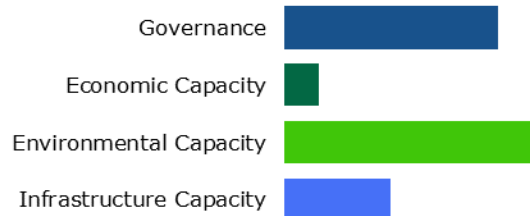


Table 34. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>78.9</b> Crime Victims per 100K	<b>33.9%</b> Households with Garbage Collection
	<b>Economic Capacity</b>	<b>\$259.1</b> Remittances per Capita (USD)	<b>6.6</b> Businesses per 1,000 Persons
	<b>Environmental Capacity</b>	<b>78.2%</b> Protected Land	<b>5.2%</b> Reforested Area
	<b>Infrastructure Capacity</b>		
	<b>Health Care Capacity</b>	<b>1.7</b> Hospital Beds per 10,000 Persons	<b>2.2</b> Nurses per 10,000 Persons
	<b>Communications Capacity</b>	<b>3.3%</b> Households with Access to Fixed Phone Line	<b>72.6%</b> Households with Access to Mobile Phone
	<b>Transportation Capacity</b>	<b>16.8 km</b> Average Distance to Nearest Port or Airport	<b>48.7 km</b> Total Length of Road per 100 km <sup>2</sup> (area)

<sup>52</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>53</sup> Rank: 17 of 22 Departments (Score: 0.486)**

Sololá's score and ranking are due to moderate Vulnerability combined with high Coping Capacity scores.

Table 35. The 3 thematic areas with the weakest relative scores



**Information  
Access  
Vulnerability**



**Population  
Pressures**



**Health Care  
Capacity**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>54</sup> Rank: 7 of 22 Departments (Score: 0.560)**

Sololá's score and ranking are due to very high Multi-Hazard Exposure combined with moderate Vulnerability and high Coping Capacity scores.

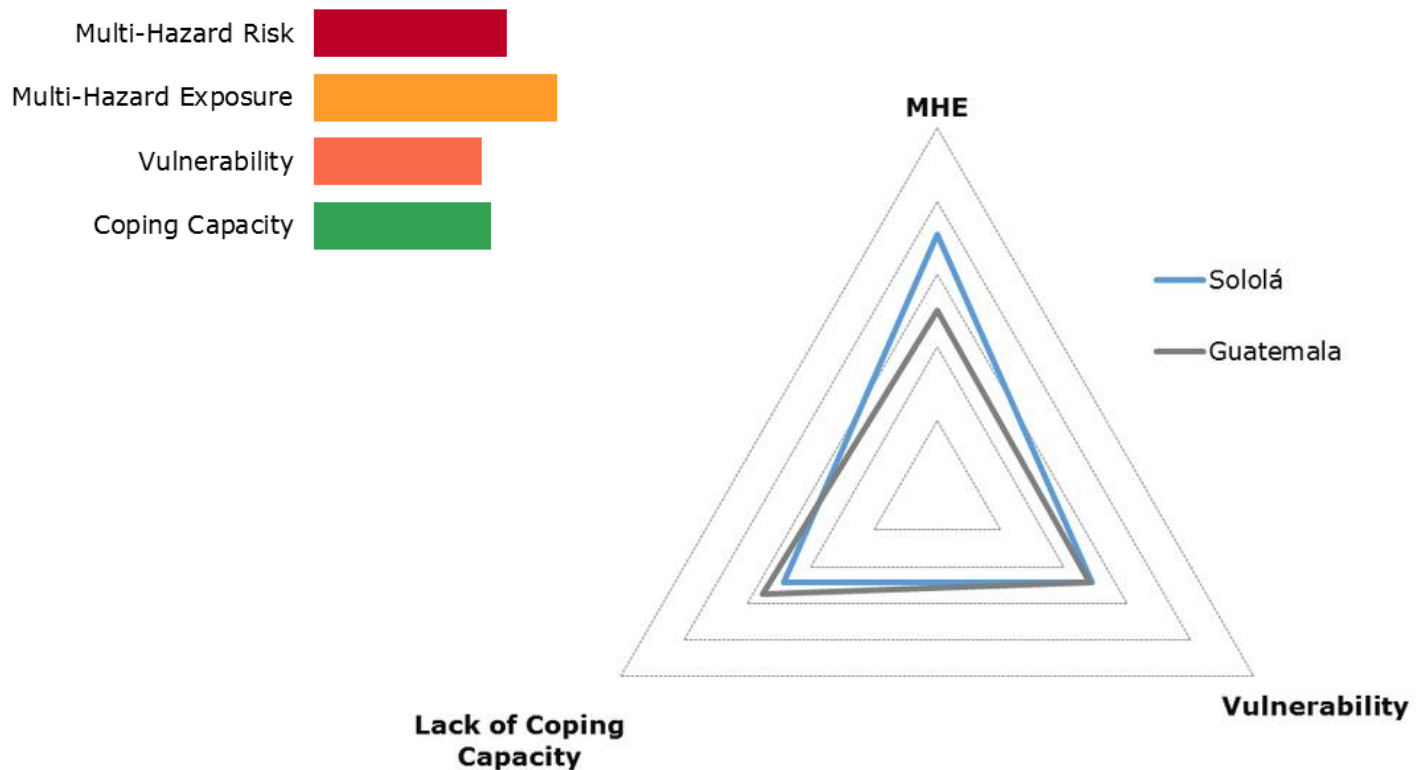


Figure 47. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>53</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>54</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Highest overall governance

Ranked 1 of 22 departments, high governance could facilitate the implementation of disaster management initiatives into departmental and municipal communities.



### Highest environmental capacity

Ranked 1 of 22 departments, high environmental capacity indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.



### Lowest vulnerable health status

Ranked 22 of 22 departments, low health vulnerability could indicate a population that will be more resilient to the negative health impacts associated with major disaster events.

## Recommendations

01

### Invest in communication infrastructure

Invest in communication infrastructure to support coordinated action among local, municipal, and regional actors.

02

### Increase health education and access

Provide increased access to healthcare services through construction of facilities, incentive programs for doctors and nurses to practice in remote areas, and general health-education programs for the population. Increasing healthcare access facilitates access to vital resources before, during, and after a disaster event.

03

### Reduce population pressure

Rapid population changes are difficult to plan for, and can destabilize social, economic, and environmental systems. Analyze trends in the department to determine potential population changes and increase the update frequency of plans and SOPS to accommodate the changes.

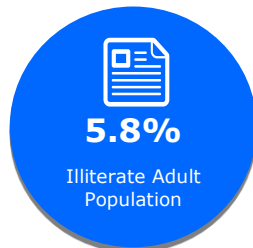
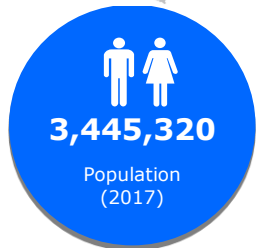
## Department: Guatemala



Department Capital: Guatemala City

Area: 2,126 km<sup>2</sup>

As the nation's capital, Guatemala City, houses the majority of the federal offices, and accounts for more than half of the industrial establishments and production of the republic.



### Municipality

Municipality	Population
Guatemala	994,604
Villa Nueva	587,563
Mixco	501,017
San Juan Sacatepéquez	247,173
Petapa	201,384
Villa Canales	165,698
Chinautla	139,701
Amatitlán	121,953
Santa Catarina Pinula	101,096
San Pedro Ayampuc	85,693
San José Pinula	83,433
Palencia	65,079
Fraijanes	51,570
San Pedro Sacatepéquez	46,109
San Raimundo	33,099
Chuarancho	14,090
San José del Golfo	6,057

### Population



**Multi-Hazard Risk Rank: High (8 of 22)**

**Lack of Resilience Rank: Very Low (21 of 22)**

## RVA Component Scores

Table 36. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
High		Very Low		Very High		Very Low		High	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.557	8	0.379	21	0.913	1	0.300	22	0.541	5

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>55</sup> Rank: 1 of 22 Departments (Score: 0.913)

Table 37. Estimated ambient population<sup>56</sup> exposed to each hazard



**100%**

**3,311,036 People**

Cyclone



**100%**

**3,311,036 People**

Earthquake



**75%**

**2,485,338 People**

Volcano



**4%**

**126,912 People**

Flood



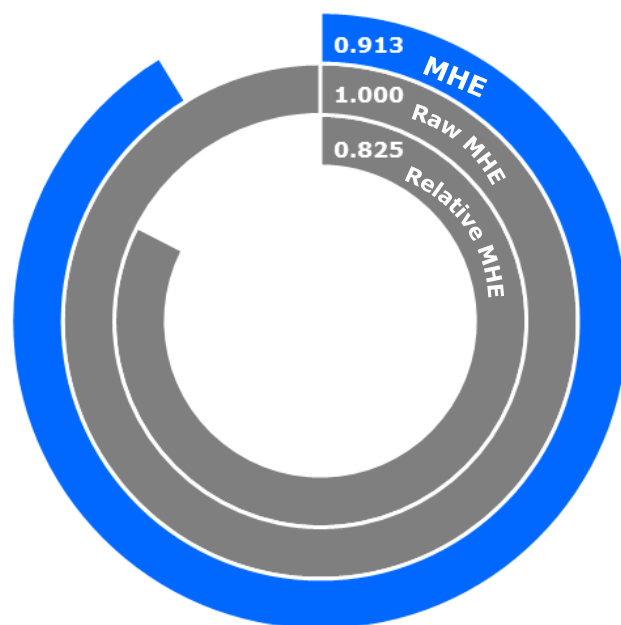
**5%**

**178,896 People**

Landslide

### El Cambray Dos Landslide

On October 1, 2015, one of the worst landslides in history devastated the village of El Cambray Dos in the municipality of Santa Catarina Pinula with a death toll near 300. Preceded by days of heavy rains during the Guatemala rainy season, the hillside gave way and buried over 100 homes, some in over 15m of debris. Occurring at night, the disaster hit while most people were in the homes unaware of the pending danger. Government officials had issued warnings to residents regarding the instability of the region and urged families to relocate.



<sup>55</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>56</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>57</sup> Rank: 22 of 22 Departments (Score: 0.300)** Very low Vulnerability in Guatemala is primarily driven by very low Information Access and Clean Water Vulnerabilities. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

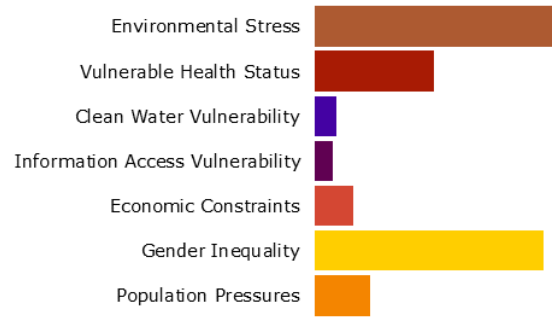









Table 38. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>70.3%</b> Province at Drought Risk	<b>-2.5%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>24</b> Infant Mortality Rate	<b>24.5</b> Maternal Mortality Ratio	<b>1.0%</b> Acute Malnutrition	<b>4.3%</b> Population Disabled	<b>16.3</b> TB Incidence	<b>16.6</b> Dengue Prevalence	<b>2.3</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>90.5%</b> Households with Access to Improved Water	<b>89.7%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>5.8%</b> Adult Illiteracy	<b>7.6</b> Average Years of Schooling	<b>92.9%</b> Primary School Enrollment	<b>19.6%</b> Households with Internet	<b>60.9%</b> Households with Cable TV	<b>91.1%</b> Households with Radio	<b>14.2%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.56</b> Economic Dependency Ratio	<b>33.3%</b> Population in Poverty	<b>0.47</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>15.6%</b> Female Seats in Congress	<b>0.07</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.31</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>2.5%</b> Average Annual Population Change	<b>1.4%</b> Average Annual Urban Population Change	<b>29.1%</b> Food Insecurity				

<sup>57</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>58</sup> Rank: 5 of 22 Departments (Score: 0.541)** Guatemala displays a high level of Coping Capacity, which is attributable to high Economic and Infrastructure Capacities. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

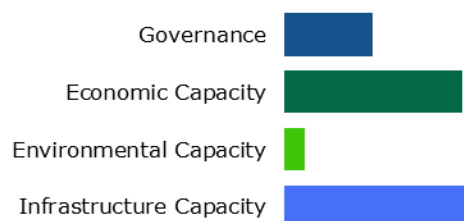


Table 39. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>486.6</b> Crime Victims per 100K	<b>29.5%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$270.8</b> Remittances per Capita (USD)	<b>25.9</b> Businesses per 1,000 Persons	<b>29,869</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>2.5%</b> Protected Land	<b>0.2%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>16.4</b> Hospital Beds per 10,000 Persons	<b>15.9</b> Nurses per 10,000 Persons	<b>11.9</b> Physicians per 10,000 Persons	<b>13.8 km</b> Average Distance to Nearest Hospital	<b>91.5%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>21.8%</b> Households with Access to Fixed Phone Line	<b>91.5%</b> Households with Access to Mobile Phone	<b>99.9%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>20.2km</b> Average Distance to Nearest Port or Airport	<b>40.3km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>58</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.



## Lack of Resilience (LR)

**Lack of Resilience<sup>59</sup> Rank: 21 of 22 Departments (Score: 0.379)**

Guatemala's score and ranking are due to very low Vulnerability combined with high Coping Capacity scores.

Table 40. The 3 thematic areas with the weakest relative scores



**Gender Inequality**



**Environmental Stress**



**Governance**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>60</sup> Rank: 8 of 22 Departments (Score: 0.557)**

Guatemala's Multi-Hazard Risk score and ranking are driven primarily by its very high Multi-Hazard Exposure combined with very low Vulnerability, and high Coping Capacity scores.

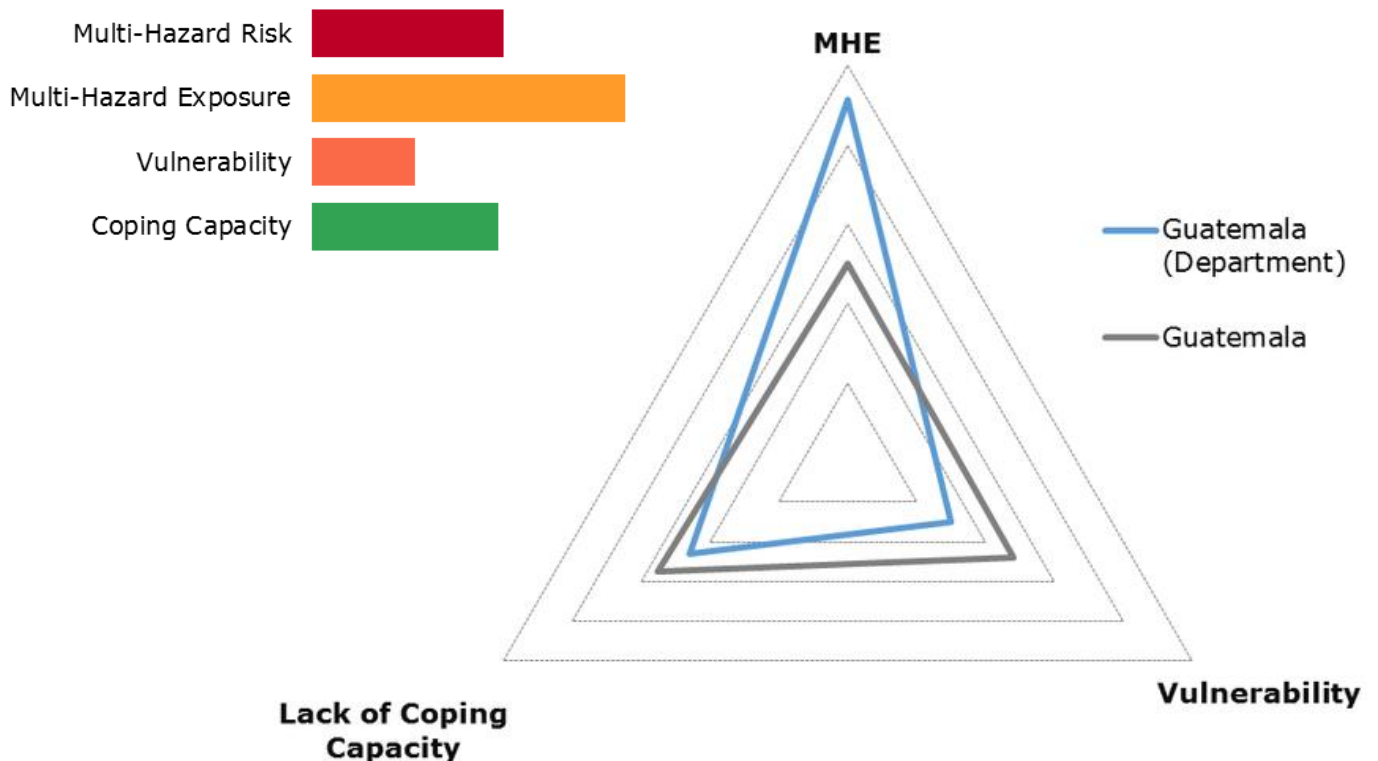


Figure 48. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>59</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>60</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Lowest overall vulnerability

Ranked 22 of 22 departments, low overall vulnerability indicates that Guatemala department is less susceptible to the negative impacts of a disaster and will likely recover faster after an event.



### Lowest poverty rate

Ranked 22 of 22 departments (33.3% Poverty Rate), low poverty rates indicate an increased ability to invest in mitigation and preparedness measures at the individual, household, and department level.



### Highest infrastructure capacity

Ranked 1 of 22 departments, well developed infrastructure – communication, health care, transportation – facilitates the exchange of information, and physical distribution of goods and services to the population.

## Recommendations

01

### Provide increased opportunities for women

Public education and awareness programs that focus on increasing the role of women in the workplace and the society will improve resilience and decrease vulnerability.

02

### Increase governance

High crime rates in the capital city result in low governance scores. Youth-education programs, increased law enforcement, and personal safety-education messages can decrease crime and increase coping capacity.

03

### Introduce environmental programs

While environmental programs are not weighted heavily in the analysis, an increased emphasis on land preservation, reforestation, and drought-resistant farming can decrease vulnerability and increase coping capacity.

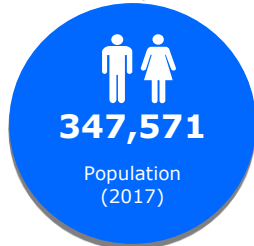
**Department: Retalhuleu**



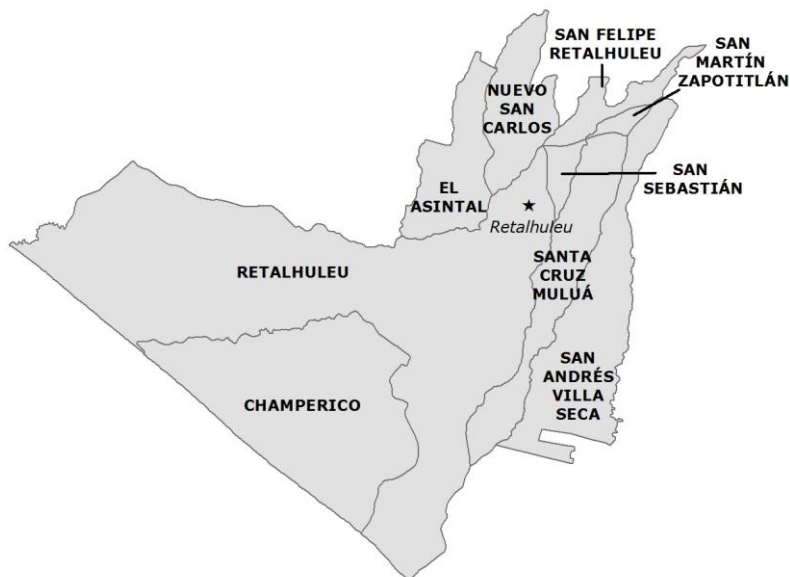
Department Capital: Retalhuleu

Area: 1,856 km<sup>2</sup>

Retalhuleu is located in southwestern Guatemala, bordering the Pacific Ocean. The capital city and its surrounding areas are home to coffee and sugarcane plantations, bee farms, livestock and numerous grains. The port of Champerico serves as the main port for Guatemala’s shrimping fleet.



Municipality	Population
Retalhuleu	94,658
El Asintal	47,038
San Andrés Villa Seca	41,449
Champerico	40,827
Nuevo San Carlos	34,206
San Sebastián	31,932
San Felipe	29,566
Santa Cruz Muluá	14,525
San Martín Zapotitlán	13,370



**Multi-Hazard Risk Rank: Moderate (9 of 22)**

**Lack of Resilience Rank: Moderate (14 of 22)**

**RVA Component Scores**

Table 41. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Moderate		Moderate		High		Low		Moderate	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.546	9	0.497	14	0.643	8	0.411	18	0.418	12

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>61</sup> Rank: 8 of 22 Departments (Score: 0.643)

Table 42. Estimated ambient population<sup>62</sup> exposed to each hazard



Cyclone

**100%**

**314,872 People**



Earthquake

**100%**

**314,872 People**



Volcano

**98%**

**308,984 People**



Flood

**16%**

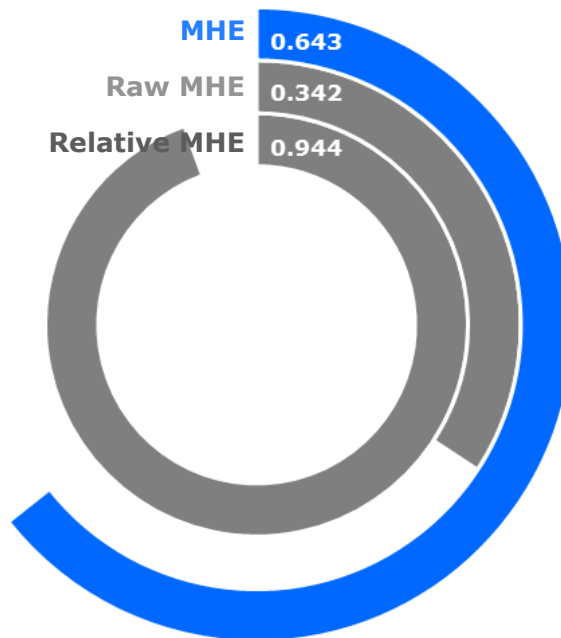
**51,890 People**



Landslide

**<1%**

**398 People**



<sup>61</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>62</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>63</sup> Rank: 18 of 22 Departments (Score: 0.411)** Vulnerability in Retalhuleu is primarily driven by Clean Water Vulnerability and Vulnerable Health Status. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

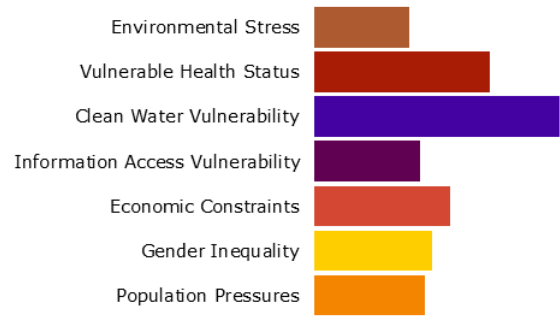









Table 43. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>38.6%</b> Province at Drought Risk	<b>1.4%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>8</b> Infant Mortality Rate	<b>57.3</b> Maternal Mortality Ratio	<b>1.1%</b> Acute Malnutrition	<b>4.11%</b> Population Disabled	<b>16.9</b> TB Incidence	<b>33.4</b> Dengue Prevalence	<b>23.5</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>57.0%</b> Households with Access to Improved Water	<b>43.9%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>5.9%</b> Adult Illiteracy	<b>5.7</b> Average Years of Schooling	<b>86.1%</b> Primary School Enrollment	<b>6.0%</b> Households with Internet	<b>48.1%</b> Households with Cable TV	<b>78.0%</b> Households with Radio	<b>15.7%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.78</b> Economic Dependency Ratio	<b>56.1%</b> Population in Poverty	<b>0.46</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>33.3%</b> Female Seats in Congress	<b>0.09</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.08</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>2.9%</b> Average Annual Population Change	<b>0.1%</b> Average Annual Urban Population Change	<b>45.7%</b> Food Insecurity				

<sup>63</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>64</sup> Rank: 12 of 22 Departments (Score: 0.418)** Retalhuleu displays a very low Environmental Capacity and moderate Governance and Infrastructure Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Coping Capacity score.

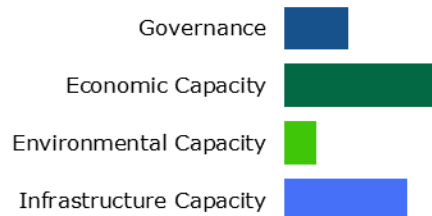


Table 44. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>295.8</b> Crime Victims per 100K	<b>7.0%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$509.5</b> Remittances per Capita (USD)	<b>45.9</b> Businesses per 1,000 persons	<b>11,400</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>1.1%</b> Protected Land	<b>1.4%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>22.5</b> Hospital Beds per 10,000 Persons	<b>4.0</b> Nurses per 10,000 Persons	<b>2.8</b> Physicians per 10,000 Persons	<b>21.3 km</b> Average Distance to Nearest Hospital	<b>86.1%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>6.0%</b> Households with Access to Fixed Phone Line	<b>86.0%</b> Households with Access to Mobile Phone	<b>94.8%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>19.7 km</b> Average Distance to Nearest Port or Airport	<b>19.8 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>64</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>65</sup> Rank: 14 of 22 Departments (Score: 0.497)**

Retalhuleu's score and ranking are due to low Vulnerability combined with moderate Coping Capacity scores.

Table 45. The 3 thematic areas with the weakest relative scores



**Clean Water  
Vulnerability**



**Vulnerable  
Health Status**



**Governance**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>66</sup> Rank: 9 of 22 Departments (Score: 0.546)**

Retalhuleu's score and ranking are due to high Multi-Hazard Exposure combined with low vulnerability and moderate Coping Capacity scores.

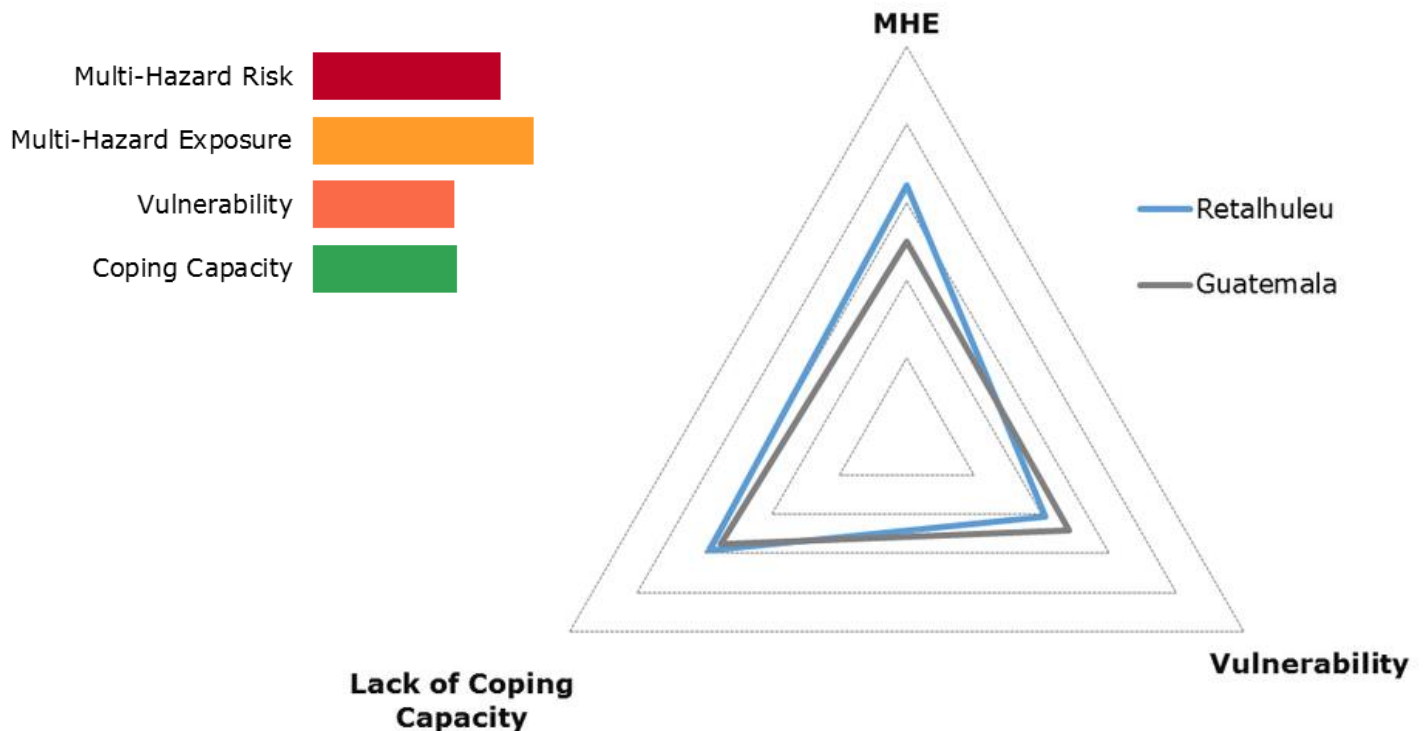


Figure 49. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>65</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>66</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Low economic constraints

Ranked 18 of 22 departments, low economic constraints indicate an increased ability to invest in mitigation and preparedness measures at the individual, household, and department level.



### Low gender inequality

Ranked 20 of 22 departments, low gender inequality indicates that vulnerable populations are more likely to have their needs met under 'normal' conditions and may be less susceptible during times of disaster.



### Low environmental stress

Ranked 18 of 22 departments, low environmental stress indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.

## Recommendations

01

### Invest in water infrastructure

Increased availability of clean water sources and proper sanitation services will decrease vulnerability and allow for quicker recovery in the event of disaster.

02

### Increased governance

Similar to clean water, investments in government services such as garbage collection and increased police presence can increase coping capacity by bringing stability to the department.

03

### Increase health education

Provide health-education services for the population, especially new mothers and other special needs populations, to increase resilience.



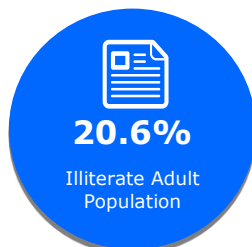
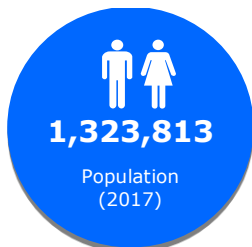
**Department: Huehuetenango**



Department Capital: Huehuetenango

Area: 7,403 km<sup>2</sup>

Huehuetenango is located in the western highlands region of Guatemala and borders Mexico both to the north and west. Huehuetenango has the most ethnically diverse populations with many of the local Mayan groups speaking their own languages.

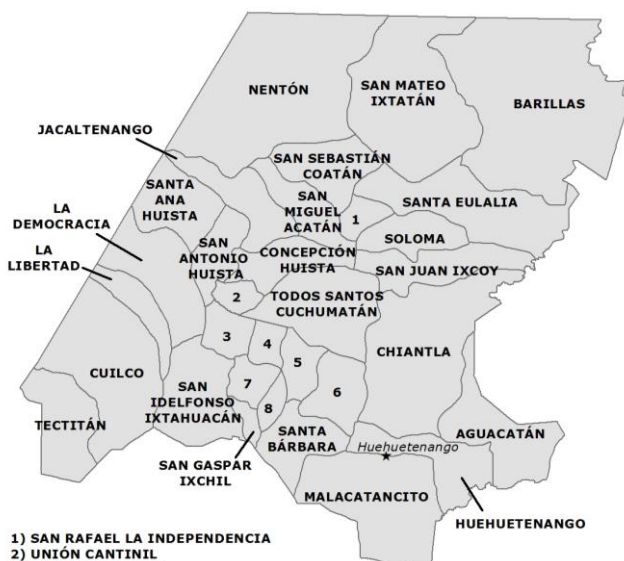


**Municipality**

Santa Cruz Barillas	177,354
Huehuetenango	123,918
Chiantla	107,555
Cuilco	64,234
Aguacatán	58,523
Soloma	56,748
Santa Eulalia	55,194
Nentón	52,133
San Idelfonso Ixtahuacán	49,581
Jacaltenango	48,667
La Democracia	47,535
San Mateo Ixtatán	43,750
La Libertad	42,237
Todos Santos Cuchumatán	39,049
San Pedro Necta	36,837
San Sebastián Huehuetenango	32,693
San Juan Ixcoy	30,782
Colotenango	28,454
San Sebastián Coatán	27,465
San Miguel Acatán	26,719
Malacatancito	23,513
Unión Cantinil	21,414
San Antonio Huista	20,617
Concepción	19,558
Santa Bárbara	17,811
San Juan Atitán	16,261

**Population**

177,354
123,918
107,555
64,234
58,523
56,748
55,194
52,133
49,581
48,667
47,535
43,750
42,237
39,049
36,837
32,693
30,782
28,454
27,465
26,719
23,513
21,414
20,617
19,558
17,811
16,261



- 1) SAN RAFAEL LA INDEPENDENCIA
- 2) UNIÓN CANTINIL
- 3) SAN PEDRO NECTA
- 4) SANTIAGO CHIMALTENANGO
- 5) SAN JUAN ATITÁN
- 6) SAN SEBASTIÁN HUEHUETENANGO
- 7) COLOTENANGO
- 8) SAN RAFAEL PÉTZAL

**Multi-Hazard Risk Rank: Moderate (10 of 22)**

**Lack of Resilience Rank: High (6 of 22)**

**RVA Component Scores**

Table 46. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Moderate		High		Moderate		Moderate		Very Low	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.541	10	0.575	6	0.471	12	0.466	11	0.316	19

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>67</sup> Rank: 12 of 22 Departments (Score: 0.471)

Table 47. Estimated ambient population<sup>68</sup> exposed to each hazard



**46%**

**507,526 People**

Cyclone



**100%**

**1,107,116 People**

Earthquake



**1%**

**12,651 People**

Volcano



**3%**

**37,896 People**

Flood



**26%**

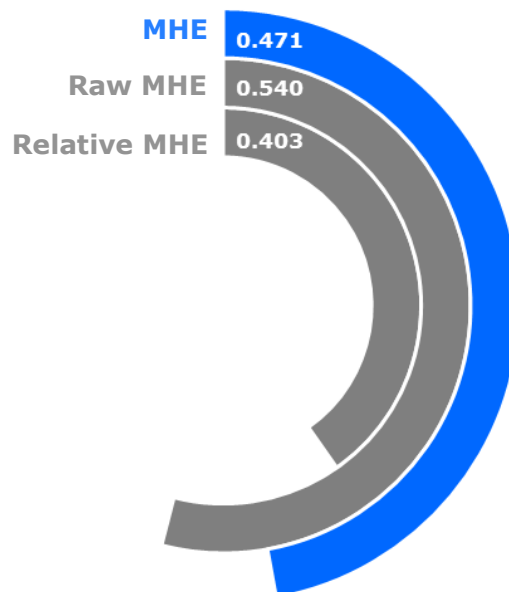
**284,851 People**

Landslide

### Save the Children

Save the Children opened its offices in Guatemala in 1999. Save the Children works alongside community and national stakeholders to increase access to quality early-child development and bilingual, multicultural education across almost 80 communities in the departments of Quiché, Huehuetenango, and Sololá. Save the Children promotes early childhood-development training for parents and activities for teachers, targeted school health and nutrition strategies for creating healthier learning environments, youth financial literacy, and the promotion of learner-centered teaching methodologies that ease children's transitions to formal education, while celebrating their cultural heritage and individual learning styles.

<http://www.savethechildren.org/site/c.8rKLIXMGIpI4E/b.6151425/>



<sup>67</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>68</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>69</sup> Rank: 11 of 22 Departments (Score: 0.466)** Vulnerability in Huehuetenango is primarily driven by Information Access Vulnerability, Economic Constraints, and Clean Water Vulnerability. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Vulnerability score.

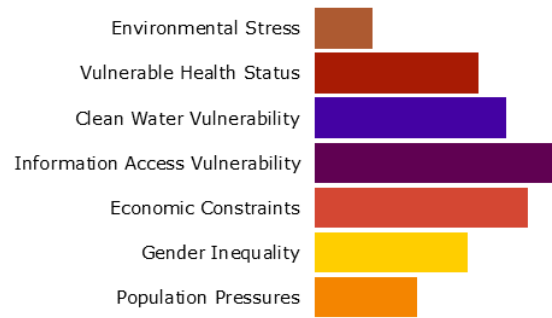









Table 48. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>32.9%</b> Province at Drought Risk	<b>2.6%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>49</b> Infant Mortality Rate	<b>218.8</b> Maternal Mortality Ratio	<b>0.4%</b> Acute Malnutrition	<b>1.02%</b> Population Disabled	<b>13.4</b> TB Incidence	<b>2.4</b> Dengue Prevalence	<b>6.2</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>78.9%</b> Households with Access to Improved Water	<b>37.3%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>20.6%</b> Adult Illiteracy	<b>4.2</b> Average Years of Schooling	<b>81.4%</b> Primary School Enrollment	<b>3.4%</b> Households with Internet	<b>25.5%</b> Households with Cable TV	<b>69.7%</b> Households with Radio	<b>57.5%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.86</b> Economic Dependency Ratio	<b>73.8%</b> Population in Poverty	<b>0.49</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>40.0%</b> Female Seats in Congress	<b>0.12</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.15</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>3.8%</b> Average Annual Population Change	<b>0.7%</b> Average Annual Urban Population Change	<b>33.5%</b> Food Insecurity				

<sup>69</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country’s normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>70</sup> Rank: 19 of 22 Departments (Score: 0.316)** Huehuetenango displays a very low level of Coping Capacity, which is attributable to very low Economic Capacity and Infrastructure Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Coping Capacity score.

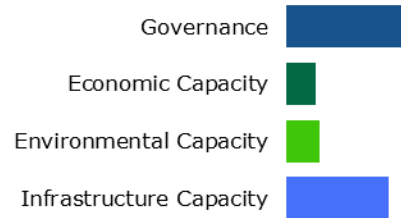


Table 49. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>112.3</b> Crime Victims per 100K	<b>14.6%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$467.9</b> Remittances per Capita (USD)	<b>3.4</b> Businesses per 1,000 Persons	<b>4,113.4</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>1.1%</b> Protected Land	<b>1.4%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>7.6</b> Hospital Beds per 10,000 Persons	<b>1.7</b> Nurses per 10,000 Persons	<b>1.6</b> Physicians per 10,000 Persons	<b>34.0 km</b> Average Distance to Nearest Hospital	<b>93.1%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>4.2%</b> Households with Access to Fixed Phone Line	<b>81.5%</b> Households with Access to Mobile Phone	<b>93.7%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>36.1 km</b> Average Distance to Nearest Port or Airport	<b>16.6 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>70</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>71</sup> Rank: 6 of 22 Departments (Score: 0.575)**

Huehuetenango's score and ranking are due to moderate Vulnerability combined with very low Coping Capacity scores.

Table 50. The 3 thematic areas with the weakest relative scores



**Information  
Access  
Vulnerability**



**Economic  
Constraints**



**Economic  
Capacity**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>72</sup> Rank: 10 of 22 Departments (Score: 0.541)**

Huehuetenango's score and ranking are due to moderate Multi-Hazard Exposure combined with moderate vulnerability and very low Coping Capacity scores.

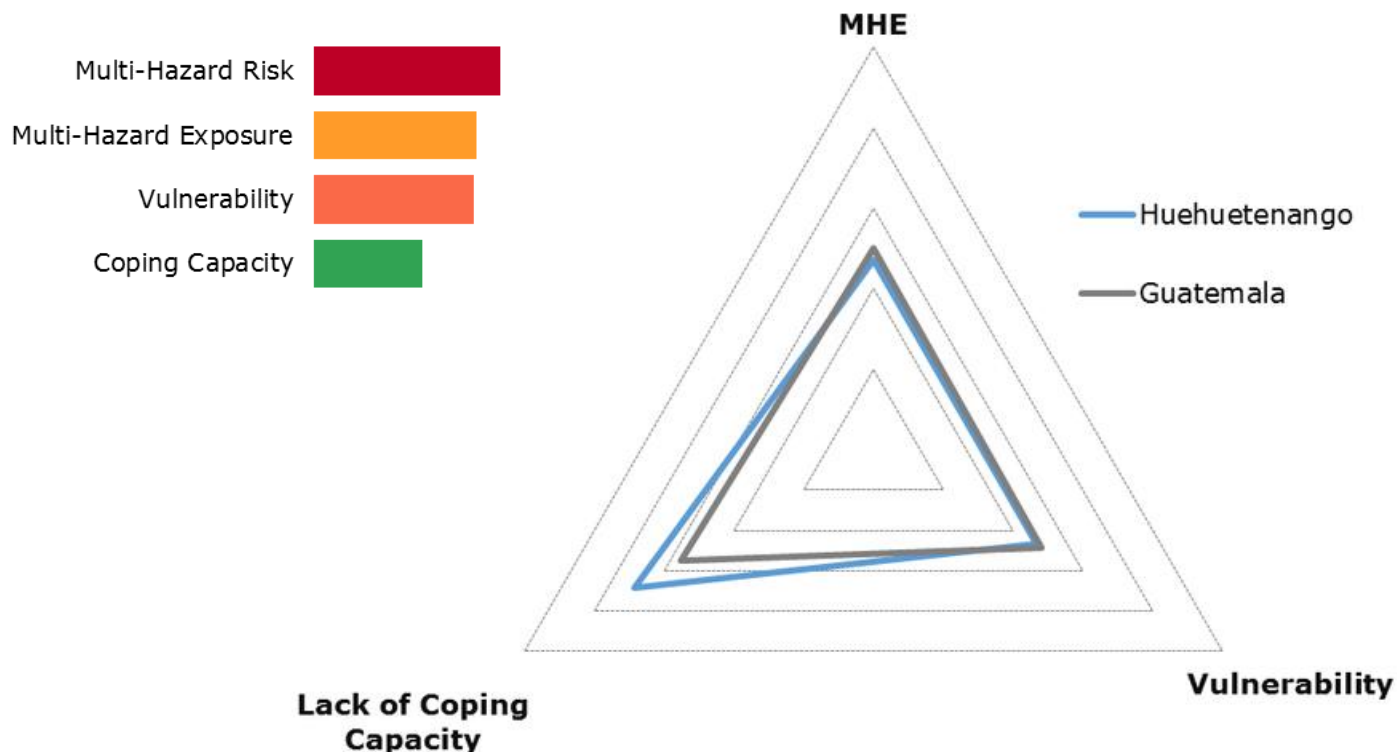


Figure 50. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>71</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>72</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Low environmental stress

Ranked 21 of 22 departments, low environmental stress indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.



### Low population pressure

Ranked 18 of 22 departments, limited population change allows disaster managers to form accurate evacuation, sheltering, and resource plans.

## Recommendations

01

### Invest in communication infrastructure

Increase access to communications for the population through investments in infrastructure and education. By increasing citizen access to information, disaster managers can provide disaster-related information to a greater percentage of the population.

02

### Increase economic opportunity

Investment in business development and public education to increase economic capacity.

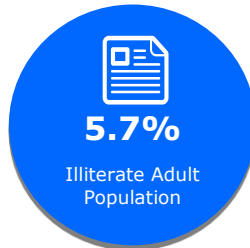
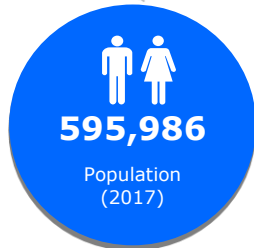
## Department: Suchitepéquez



Department Capital: Mazatenango

Area: 2,510 km<sup>2</sup>

Suchitepéquez is in southwestern Guatemala, with a small coastline along the Pacific Ocean. The main agricultural crops in the department are sugar cane, rubber, corn, beans, bananas, and plantains.



### Municipality

Mazatenango	109,774
Cuyotenango	59,360
San Antonio Suchitepéquez	56,784
Chicacao	56,018
Patulul	48,025
Santo Domingo Suchitepéquez	38,015
Santa Bárbara	26,628
San Bernardino	24,258
Samayac	23,670
Río Bravo	22,462
San Pablo Jocopilas	22,001
San Francisco Zapotitlán	21,225
Santo Tomás la Unión	13,649
San Lorenzo	13,607
San Juan Bautista	12,631
Pueblo Nuevo	12,490
San José el Idolo	10,109
San Miguel Panán	9,176
Zunilito	9,060
San Gabriel	7,047

### Population



- 1) SAN BERNARDINO
- 2) SAN ANTONIO SUCHITEPÉQUEZ
- 3) SAN MIGUEL PANÁN

**Multi-Hazard Risk Rank:  
Moderate (11 of 22)**

**Lack of Resilience Rank:  
Moderate (10 of 22)**

## RVA Component Scores

Table 51. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Moderate		Moderate		Moderate		Low		Low	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.539	11	0.519	10	0.580	11	0.434	15	0.397	15

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>73</sup> Rank: 11 of 22 Departments (Score: 0.580)

Table 52. Estimated ambient population<sup>74</sup> exposed to each hazard



Cyclone

**100%**

**527,143  
People**



Earthquake

**100%**

**527,143  
People**



Volcano

**40%**

**210,952  
People**



Flood

**18%**

**95,065  
People**



Landslide

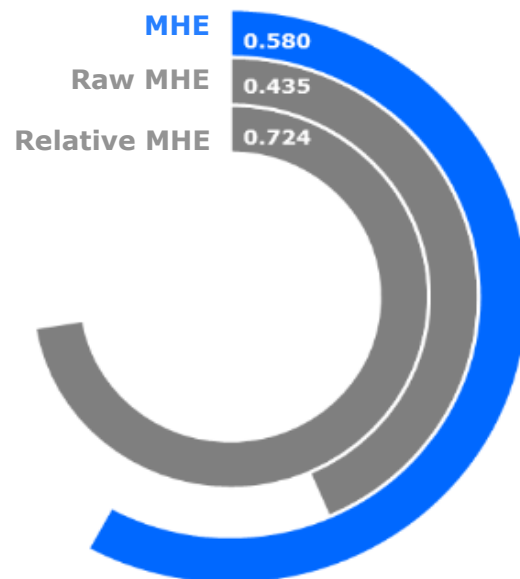
**<1%**

**1,700  
People**

### Chocolá

Chocolá dates to the late Pre-Classic (400BC to 200AD) period. It has over 100 structures, including large palaces, a ball field, and pottery workshops. Over 3,000 objects have been found, including pots, altars, sculpted monuments, and very delicate manufacturing ceramic figurines. Suchitepéquez produces some of the best quality cocoa in the country. Mayan culture used cocoa nuts as currency. This knowledge has led to the conjecture that an early development of such magnitude and complexity was due to the intensive cultivation of cocoa for its commercialization. A small museum dedicated to the history of cocoa is located in the modern village of Chocolá.

[http://www.turansa.com/paginas/guatemala\\_departments/suc\\_hitepequez.htm](http://www.turansa.com/paginas/guatemala_departments/suc_hitepequez.htm)



<sup>73</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>74</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.



## Vulnerability (V)

**Vulnerability<sup>75</sup> Rank: 15 of 22 Departments (Score: 0.434)** Vulnerability in Suchitepéquez is primarily driven by Vulnerable Health Status, Gender Inequality, and Economic Constraints. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Vulnerability score.

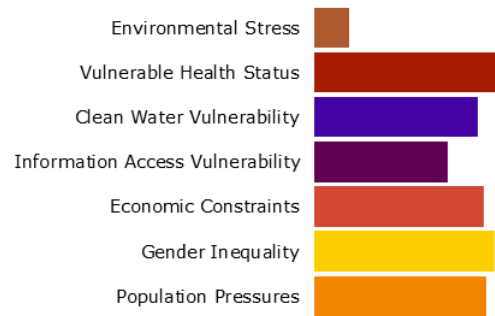









Table 53. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>20.8%</b> Province at Drought Risk	<b>2.7%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>28</b> Infant Mortality Rate	<b>94.1</b> Maternal Mortality Ratio	<b>1.1%</b> Acute Malnutrition	<b>2.3%</b> Population Disabled	<b>41.2</b> TB Incidence	<b>12.8</b> Dengue Prevalence	<b>13.8</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>69.3%</b> Households with Access to Improved Water	<b>60.7%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>5.67%</b> Adult Illiteracy	<b>5.0</b> Average Years of Schooling	<b>82.8%</b> Primary School Enrollment	<b>4.3%</b> Households with Internet	<b>50.1%</b> Households with Cable TV	<b>75.8%</b> Households with Radio	<b>23.4%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.82</b> Economic Dependency Ratio	<b>63.8%</b> Population in Poverty	<b>0.47</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>20.0%</b> Female Seats in Congress	<b>0.11</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.12</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>3.1%</b> Average Annual Population Change	<b>0.3%</b> Average Annual Urban Population Change	<b>59.0%</b> Food Insecurity				

<sup>75</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country’s normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>76</sup> Rank: 15 of 22 Departments (Score: 0.397)** Suchitepéquez displays a very low level of Coping Capacity, which is attributable to very low Governance, Economic Capacity, and Infrastructure Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Coping Capacity score.

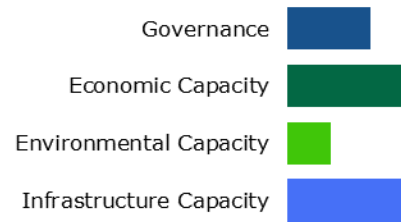


Table 54. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>304.9</b> Crime Victims per 100K	<b>10.1%</b> Households with Garbage Collection				
	<b>Economic Capacity</b>	<b>\$462.4</b> Remittances per Capita (USD)	<b>13.6</b> Businesses per 1,000 persons	<b>13,367</b> GDP per Capita (Quetzales)			
	<b>Environmental Capacity</b>	<b>5.5%</b> Protected Land	<b>0.3%</b> Reforested Area				
	<b>Infrastructure Capacity</b>						
	<b>Health Care Capacity</b>	<b>10.3</b> Hospital Beds per 10,000 Persons	<b>7.1</b> Nurses per 10,000 Persons	<b>4.1</b> Physicians per 10,000 Persons	<b>19.3 km</b> Average Distance to Nearest Hospital	<b>90.3%</b> Children Completed Immunization Schedule	
	<b>Communications Capacity</b>	<b>3.9%</b> Households with Access to Fixed Phone Line	<b>83.3%</b> Households with Access to Mobile Phone	<b>90.7%</b> Households with Access to Electricity			
	<b>Transportation Capacity</b>	<b>27.7 km</b> Average Distance to Nearest Port or Airport	<b>23.9 km</b> Total Length of Road per 100 km <sup>2</sup> (area)				

<sup>76</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>77</sup> Rank: 10 of 22 Departments (Score: 0.519)**

Suchitepéquez's score and ranking are due to low Vulnerability combined with low Coping Capacity scores.

Table 55. The 3 thematic areas with the weakest relative scores



**Vulnerable Health Status**



**Governance**



**Gender Inequality**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>78</sup> Rank: 11 of 22 Departments (Score: 0.539)**

Suchitepéquez's score and ranking are due to low Vulnerability, moderate Multi-Hazard Exposure, and low Coping Capacity scores.

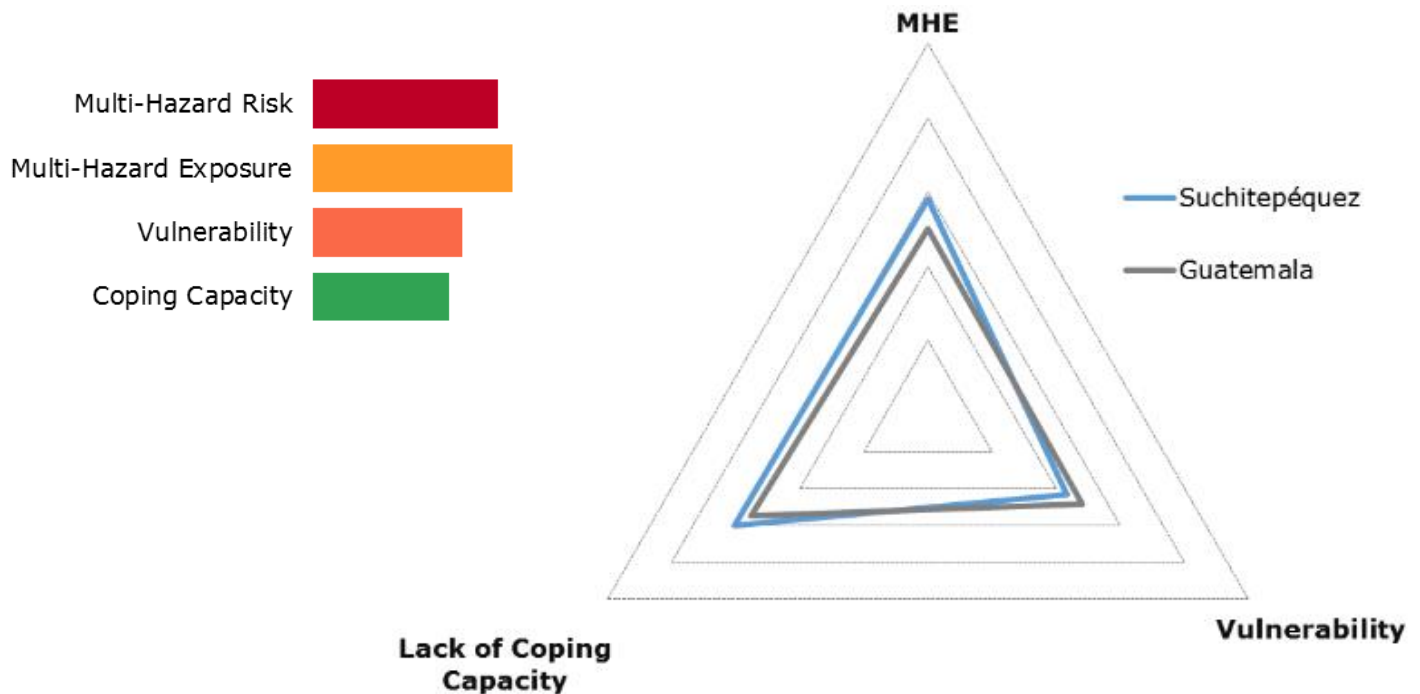


Figure 51. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>77</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>78</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Lowest environmental stress

Ranked 22 of 22 departments, low environmental stress indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.



### High information access

High information access indicates that the population has an increased ability to access and comprehend disaster-related information before, during, and after events.

## Recommendations

01

### Invest access to health care

Through education, facility construction, and traveling care programs, increase the citizens' ability to access health-related information and physical care, especially for new/expectant mothers and young children.

02

### Increase government services

Investments in public services such as garbage collection, fire, and police will increase coping capacity and the department's ability to handle crises.

03

### Provide opportunities for women

Public education and awareness programs, as well as increased business and political opportunities that focus on advancing the role of women in the workplace and the society, will improve resilience and decrease vulnerability.

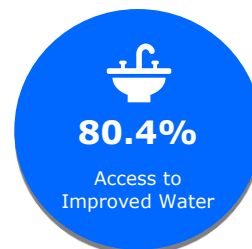
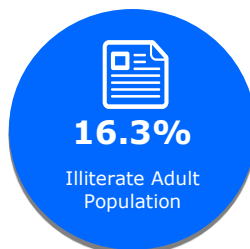
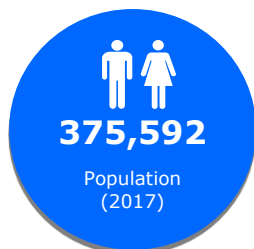
## Department: Jalapa



Department Capital: Jalapa

Area: 2,064 km<sup>2</sup>

Jalapa is in southeastern Guatemala. The department is mountainous with fertile plains and valleys where they grow crops such as corn, black beans, rice, potatoes, yucca, chili, coffee, bananas, tobacco, sugar cane, and wheat.



### Municipality

Municipality	Population
Jalapa	171,068
San Pedro Pinula	69,925
Mataquesuintla	48,885
San Luis Jilotepeque	27,931
Monjas	26,821
San Carlos Alzatate	21,411
San Manuel Chaparrón	9,550



**Multi-Hazard Risk Rank:  
Medium (12 of 22)**

**Lack of Resilience Rank:  
High (5 of 22)**

## RVA Component Scores

Table 56. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Medium		High		Low		High		Low	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.523	12	0.588	5	0.392	17	0.572	6	0.396	17

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>79</sup> Rank: 17 of 22 Departments (Score: 0.392)

Table 57. Estimated ambient population<sup>80</sup> exposed to each hazard



**98%**

**309,908 People**

Cyclone



**100%**

**316,523 People**

Earthquake



**0%**

**0 People**

Volcano



**9%**

**28,693 People**

Flood



**7%**

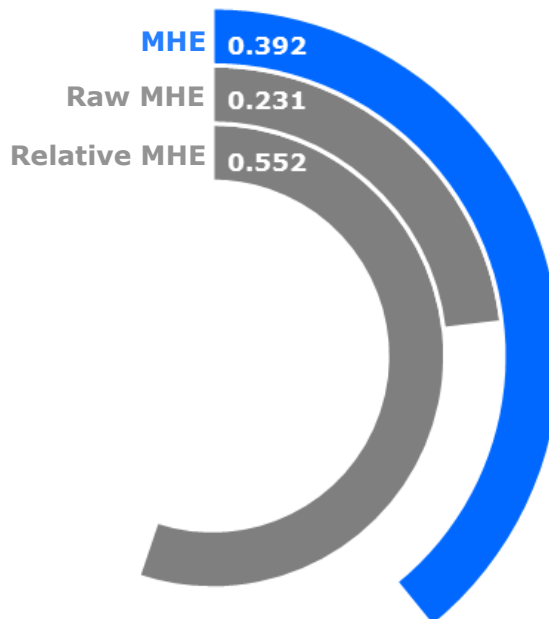
**22,918 People**

Landslide

### Wells of Hope

Overcoming many roadblocks, hurdles, and frustrations, Wells of Hope successfully transported its own drilling equipment to Jalapa, one of the poorest regions of Guatemala. In this mountainous terrain, the women walk anywhere from 2 to 10 kilometers per day in search of water, carrying 20-liter buckets of dirty, bacteria-infested water over steep, mountainous terrain, to their mud-brick, one-room homes. This contaminated water, the only source of water available to these poor, mountain communities, causes the deaths of many children before age 3.

<http://www.wellsofhope.com/>



<sup>79</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>80</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>81</sup> Rank: 6 of 22 Departments (Score: 0.572)** Vulnerability in Jalapa is primarily driven by Economic Constraints and Gender Inequality. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

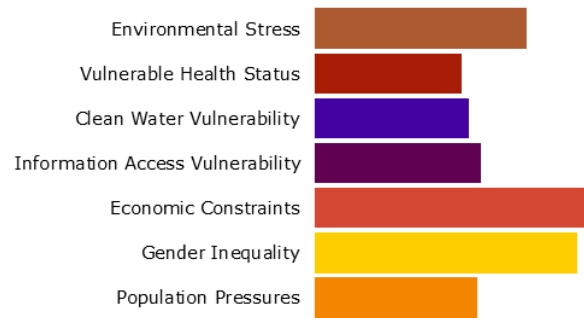









Table 58. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>75.6%</b> Province at Drought Risk	<b>-0.86%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>34</b> Infant Mortality Rate	<b>45.2</b> Maternal Mortality Ratio	<b>0.6%</b> Acute Malnutrition	<b>3.6%</b> Population Disabled	<b>4.6</b> TB Incidence	<b>9.0</b> Dengue Prevalence	<b>22.3</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>80.4%</b> Households with Access to Improved Water	<b>50.1%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>16.3%</b> Adult Illiteracy	<b>4.5</b> Average Years of Schooling	<b>76.5%</b> Primary School Enrollment	<b>6.8%</b> Households with Internet	<b>40.7%</b> Households with Cable TV	<b>77.6%</b> Households with Radio	<b>0.1%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.97</b> Economic Dependency Ratio	<b>67.2%</b> Population in Poverty	<b>0.58</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.05</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.35</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>3.5%</b> Average Annual Population Change	<b>3.6%</b> Average Annual Urban Population Change	<b>39.9%</b> Food Insecurity				

<sup>81</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>82</sup> Rank: 17 of 22 Departments (Score: 0.396)** Jalapa displays a low level of Coping Capacity, which is attributable to very low Environmental Capacity and Governance. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

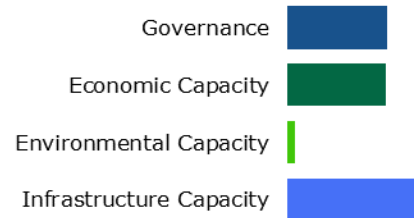


Table 59. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>207.2</b> Crime Victims per 100K	<b>19.5%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$470.1</b> Remittances per Capita (USD)	<b>11.97</b> Businesses per 1,000 persons	<b>10,708</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>1.0%</b> Protected Land	<b>0.6%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>9.2</b> Hospital Beds per 10,000 Persons	<b>1.4</b> Nurses per 10,000 Persons	<b>2.4</b> Physicians per 10,000 Persons	<b>18.2 Km</b> Average Distance to Nearest Hospital	<b>93.4%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>6.8%</b> Households with Access to Fixed Phone Line	<b>80.8%</b> Households with Access to Mobile Phone	<b>88.3%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>44.9 km</b> Average Distance to Nearest Port or Airport	<b>31.5 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>82</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.



## Lack of Resilience (LR)

**Lack of Resilience<sup>83</sup> Rank: 5 of 22 Departments (Score: 0.588)**

Jalapa's score and ranking are due to high Vulnerability combined with low Coping Capacity scores.

Table 60. The 3 thematic areas with the weakest relative scores



**Gender Inequality**



**Economic Constraints**



**Environmental Capacity**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>84</sup> Rank: 12 of 22 Departments (Score: 0.523)**

Jalapa's score and ranking are low Multi-Hazard Exposure combined with high Vulnerability and low Coping Capacity scores.

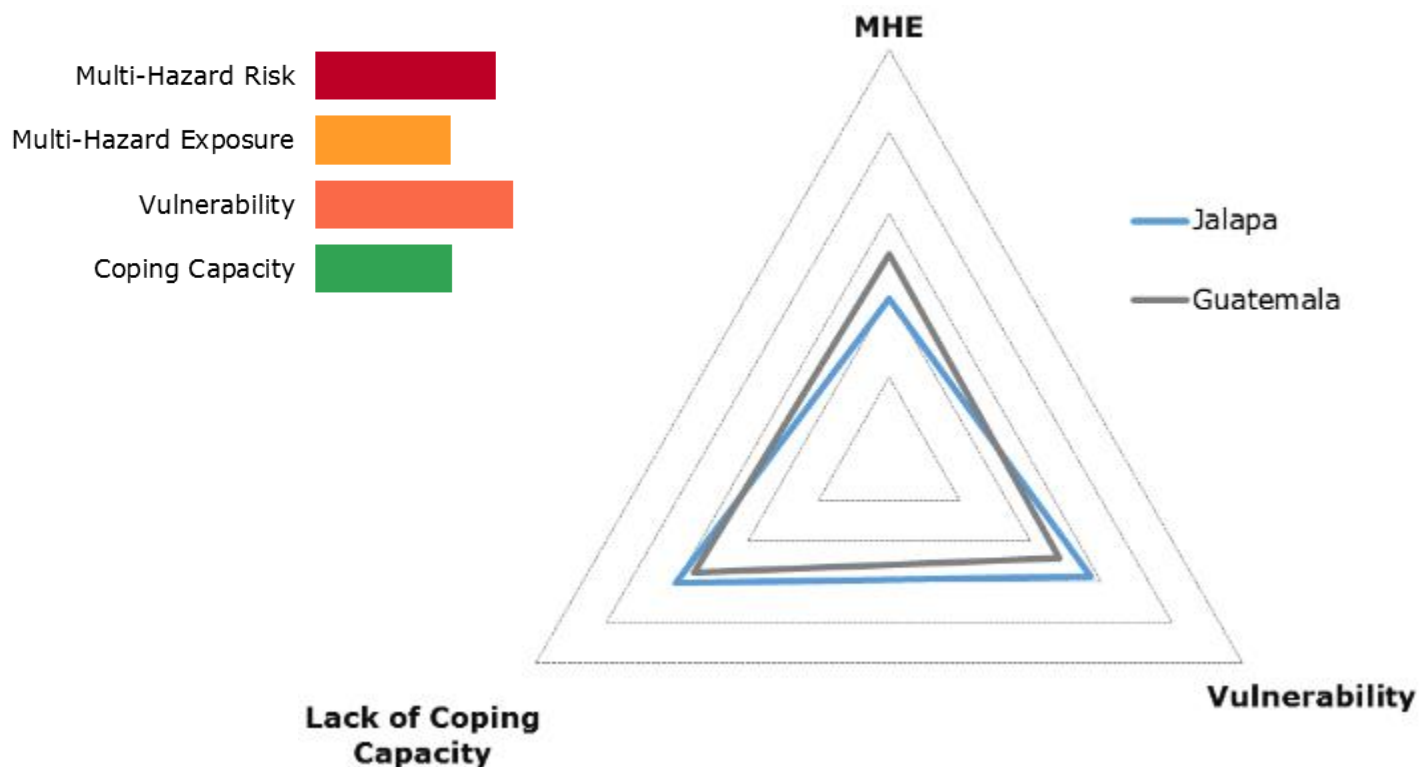


Figure 52. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>83</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>84</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### High transportation capacity

Ranked 3 of 22 departments, well developed transportation networks facilitate the movement of goods and services, decreasing wait times for response and relief supplies.



### Low vulnerable health status

Ranked 15 of 22 departments, low health vulnerability could indicate a population that will be more resilient to the negative health impacts associated with major disaster events.

## Recommendations

01

### Provide opportunities for women

Public education and awareness programs that focus on increasing the role of women in the workplace will increase the resilience of vulnerable populations.

02

### Provide budgeting and financial education

Increase community education in budgeting and finance to promote economic independence and opportunities, reducing economic constraints.

03

### Increase environmental programs

While environmental programs are not weighted heavily in the analysis, an increased emphasis on land preservation, reforestation, and drought-resistant farming can decrease vulnerability and increase coping capacity.

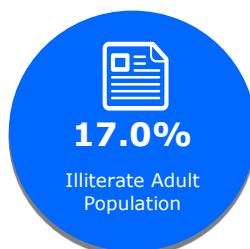
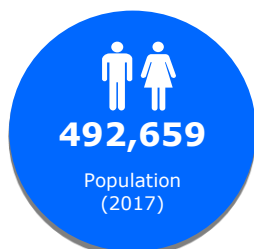
## Department: Jutiapa



Department Capital: Jutiapa

Area: 3,217 km<sup>2</sup>

Jutiapa is in southern Guatemala, bordering El Salvador and the Pacific Ocean. The population is mainly of European descent, and not indigenous, although there are pockets of indigenous peoples in the northern regions. Jutiapa supplies most of the country's grain.



### Municipality

### Population

Jutiapa	163,227
Moyuta	42,712
Asunción Mita	42,272
Comapa	31,042
Jalpatagua	27,811
Santa Catarina Mita	24,977
Quezada	22,987
Conguaco	21,803
El Progreso	19,252
Yupiltepeque	17,808
Atescatempa	16,159
Acatempa	15,140
Agua Blanca	14,973
Zapotitlán	11,161
Pasaco	10,166
El Adelanto	5,776
Jeréz	5,392



**Multi-Hazard Risk Rank: Moderate (13 of 22)**

**Lack of Resilience Rank: Moderate (9 of 22)**

## RVA Component Scores

Table 61. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Moderate		High		Moderate		High		Moderate	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.513	13	0.538	9	0.462	13	0.529	7	0.453	9

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>85</sup> Rank: 13 of 22 Departments (Score: 0.462)

Table 62. Estimated ambient population<sup>86</sup> exposed to each hazard



Cyclone

**100%**

**515,444 People**



Earthquake

**100%**

**515,444 People**



Volcano

**0%**

**0 People**



Flood

**13%**

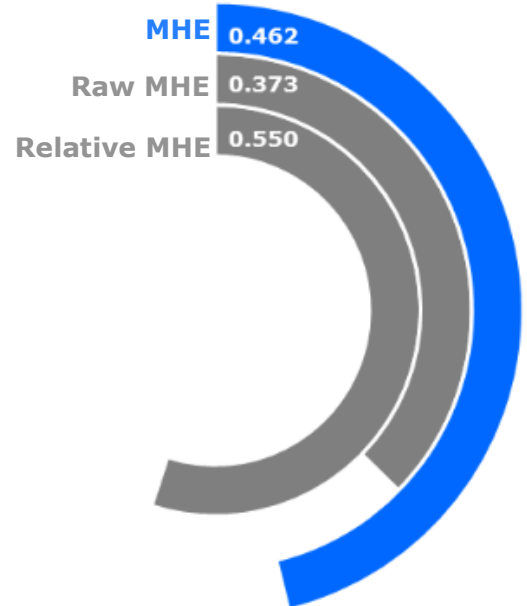
**66,795 People**



Landslide

**1%**

**4,516 People**



<sup>85</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>86</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>87</sup> Rank: 7 of 22 Departments (Score: 0.529)** Vulnerability in Jutiapa is primarily driven by Environmental Stress, Gender Inequality, and Economic Constraints. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

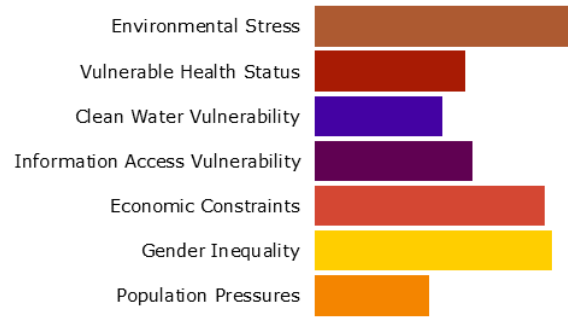









Table 63. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>65.0%</b> Province at Drought Risk	<b>-3.6%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>39</b> Infant Mortality Rate	<b>6.8</b> Maternal Mortality Ratio	<b>0.9%</b> Acute Malnutrition	<b>3.9%</b> Population Disabled	<b>7.6</b> TB Incidence	<b>8.6</b> Dengue Prevalence	<b>16.4</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>81.2%</b> Households with Access to Improved Water	<b>59.7%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>17.0%</b> Adult Illiteracy	<b>5.1</b> Average Years of Schooling	<b>79.9%</b> Primary School Enrollment	<b>3.7%</b> Households with Internet	<b>41.3%</b> Households with Cable TV	<b>80.2%</b> Households with Radio	<b>3.2%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.95</b> Economic Dependency Ratio	<b>62.7%</b> Population in Poverty	<b>0.53</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>25.0%</b> Female Seats in Congress	<b>0.09</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.34</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>1.6%</b> Average Annual Population Change	<b>1.5%</b> Average Annual Urban Population Change	<b>51.3%</b> Food Insecurity				

<sup>87</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>88</sup> Rank: 9 of 22 Departments (Score: 0.453)** Jutiapa displays a moderate level of Coping Capacity, which is attributable to low Economic Capacity and Environmental Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

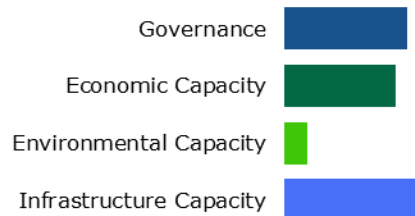









Table 64. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>207.3</b> Crime Victims per 100K	<b>19.54%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$608.0</b> Remittances per Capita (USD)	<b>10.9</b> Businesses per 1,000 persons	<b>10,940</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>2.5%</b> Protected Land	<b>0.3%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>14.6</b> Hospital Beds per 10,000 Persons	<b>1.3</b> Nurses per 10,000 Persons	<b>2.1</b> Physicians per 10,000 Persons	<b>25.3 km</b> Average Distance to Nearest Hospital	<b>95.3%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>6.1%</b> Households with Access to Fixed Phone Line	<b>81.7%</b> Households with Access to Mobile Phone	<b>94.1%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>54.9 km</b> Average Distance to Nearest Port or Airport	<b>21.5 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>88</sup> Coping Capacity: The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>89</sup> Rank: 6 of 22 Departments (Score: 0.575)**

Jutiapa's score and ranking are due to high Vulnerability combined with moderate Coping Capacity scores.

Table 65. The 3 thematic areas with the weakest relative scores



**Economic Constraints**



**Environmental Capacity**



**Gender Inequality**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>90</sup> Rank: 10 of 22 Departments (Score: 0.541)**

Jutiapa's score and ranking are due to high Vulnerability, moderate Multi-Hazard Exposure, and moderate Coping Capacity scores.

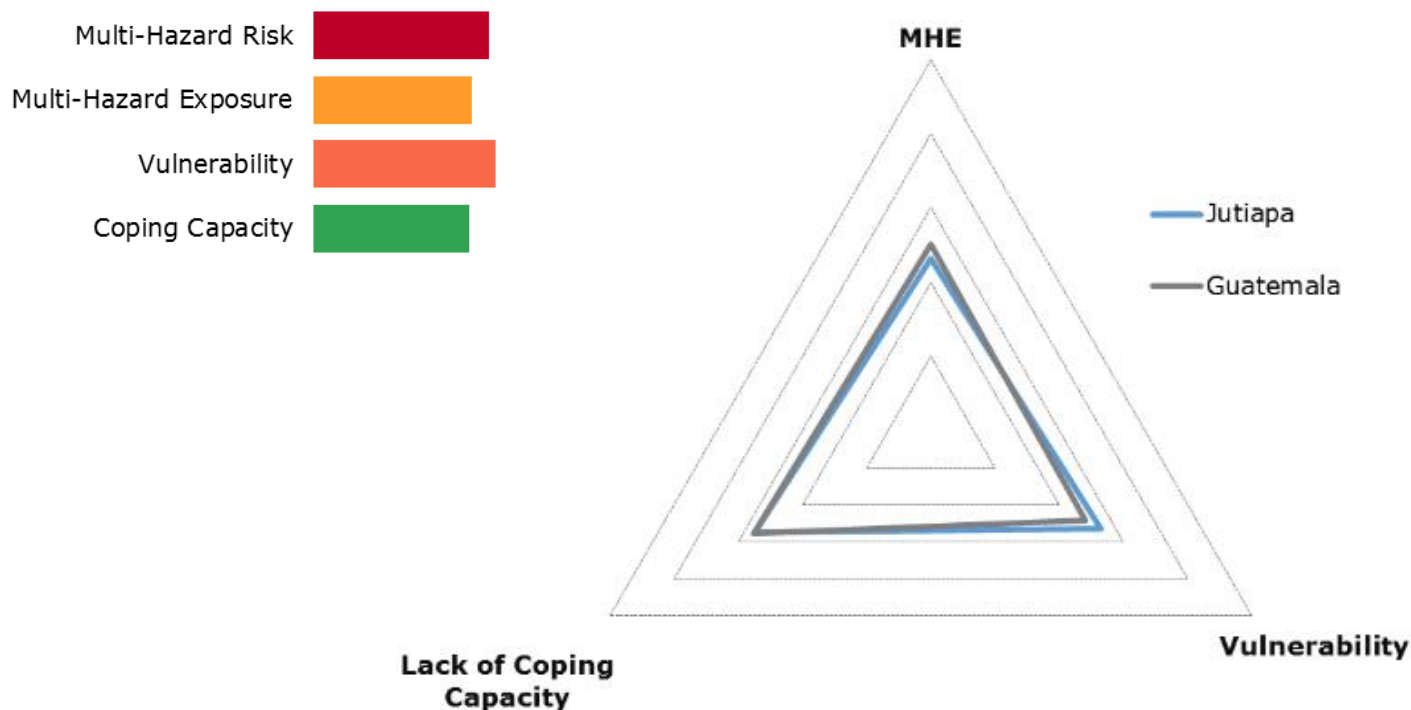


Figure 53. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>89</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>90</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Low clean water vulnerability

Ranked 17 of 22 departments, low clean water vulnerability indicates that a population has access to high water quality and good containment systems, reducing susceptibility to disaster.



### High transportation capacity

Ranked 5 of 22 departments, well developed transportation networks facilitate the movement of goods and services, decreasing wait times for response and relief supplies.

## Recommendations

01

### Provide business opportunities and education

Investment in business development and public education to increase economic capacity.

02

### Increase environmental programs

While environmental programs are not weighted heavily in the analysis, an increased emphasis on land preservation, reforestation, and drought-resistant farming can decrease vulnerability and increase coping capacity.

03

### Provide opportunities for women

Public education and awareness programs that focus on increasing the role of women in the workplace and the society will improve the resilience of women during disasters.



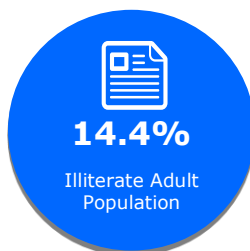
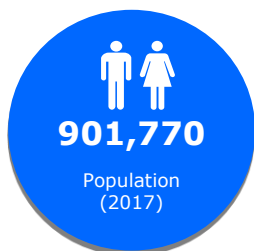
**Department: Quetzaltenango**



Department Capital: Quetzaltenango

Area: 1,951 km<sup>2</sup>

Quetzaltenango is located in the western highlands region of Guatemala. Quetzaltenango has a wide-ranging climate due to elevation changes, resulting in a variety of fruits and vegetables grown in the region. Some of the poorer populations in the higher altitudes migrate to the Pacific lowlands to work in the coffee, sugarcane, and cotton plantations.



**Municipality**

Quetzaltenango	164,486
Coatepeque	151,088
San Juan Ostuncalco	58,128
Cantel	48,484
Génova	46,041
Colomba	41,558
Olintepeque	39,989
San Carlos Sija	39,100
La Esperanza	35,381
Flores Costa Cuca	32,066
El Palmar	31,776
San Martín Sacatepéquez	28,965
Cabricán	28,935
Salcajá	20,413
Almolonga	19,976
Concepción Chiquirichapa	19,263
Huitán	17,209
San Mateo	13,987
Palestina de los Altos	13,552
Zunil	13,478
San Miguel Sigüilá	11,598
Cajolá	10,349

**Population**



- 1) CAJOLÁ
- 2) SAN MIGUEL SIGÜILA
- 3) LA ESPERANZA
- 4) CONCEPCIÓN CHIQUIRICHAPA
- 5) SAN MATEO

**Multi-Hazard Risk Rank: Moderate (14 of 22)**

**Lack of Resilience Rank: Very Low (19 of 22)**

**RVA Component Scores**

Table 66. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Moderate		Very Low		Very High		Moderate		Very High	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.505	14	0.410	19	0.694	4	0.440	14	0.619	1

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>91</sup> Rank: 4 of 22 Departments (Score: 0.694)

Table 67. Estimated ambient population<sup>92</sup> exposed to each hazard



Cyclone

**100%**

**820,882 People**



Earthquake

**100%**

**820,882 People**



Volcano

**60%**

**494,559 People**



Flood

**11%**

**88,050 People**



Landslide

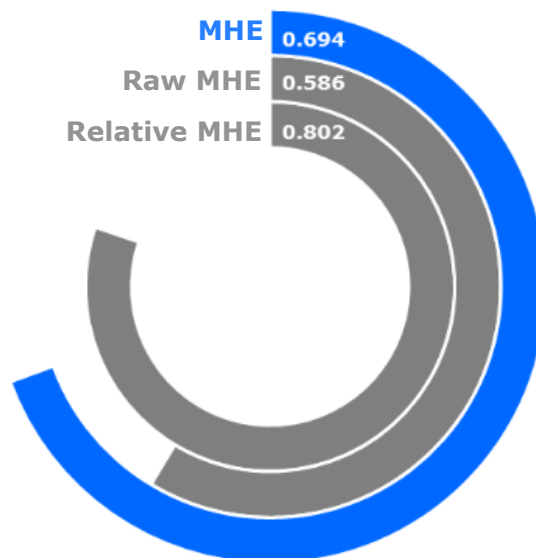
**7%**

**59,968 People**

### Global Health Initiative

In places like Cajola, Quetzaltenango, the United States Global Health Initiative (GHI) is focusing on hunger and malnutrition. GHI is targeting Mayan women and children in the mostly indigenous Western Highlands, a mountainous area with a single maize harvest per year. The cornerstone of the strategy is reducing one of the highest rates of chronic malnutrition in the world. According to the United Nations Children’s Fund, only Afghanistan and Yemen fare worse. Half of all Guatemalan children under five have stunted growth, and in the Western Highlands, it's seven out of 10.

*GHI targets chronic malnutrition in Guatemala, July 18, 2011  
By Lomi Kriel*



<sup>91</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>92</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>93</sup> Rank: 14 of 22 Departments (Score: 0.440)** Vulnerability in Quetzaltenango is primarily driven by Gender Inequality and Economic Constraints. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

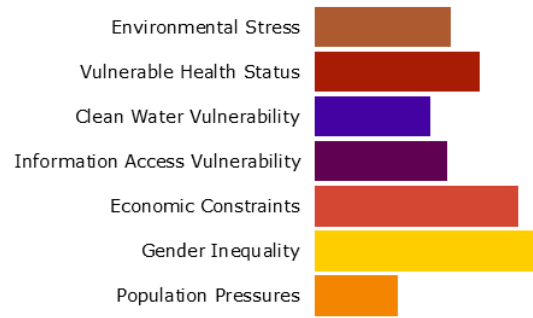









Table 68. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>41.3%</b> Province at Drought Risk	<b>-0.14%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>29</b> Infant Mortality Rate	<b>93.8</b> Maternal Mortality Ratio	<b>1.0%</b> Acute Malnutrition	<b>1.5%</b> Population Disabled	<b>19.8</b> TB Incidence	<b>11.0</b> Dengue Prevalence	<b>9.0</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>83.2%</b> Households with Access to Improved Water	<b>61.7%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>14.4%</b> Adult Illiteracy	<b>6.2</b> Average Years of Schooling	<b>80.6%</b> Primary School Enrollment	<b>10.0%</b> Households with Internet	<b>47.8%</b> Households with Cable TV	<b>88.6%</b> Households with Radio	<b>51.7%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.79</b> Economic Dependency Ratio	<b>56.0%</b> Population in Poverty	<b>0.58</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.04</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.26</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>2.9%</b> Average Annual Population Change	<b>1.2%</b> Average Annual Urban Population Change	<b>33.5%</b> Food Insecurity				

<sup>93</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>94</sup> Rank: 1 of 22 Departments (Score: 0.619)** Quetzaltenango displays the country's highest Coping Capacity, due to very high Economic Capacity, Governance, and Infrastructure Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Coping Capacity score.

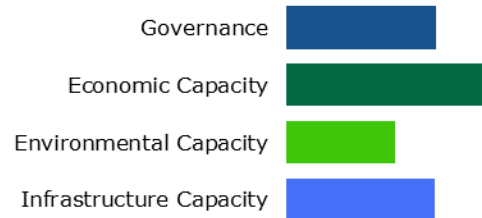


Table 69. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>218.7</b> Crime Victims per 100K	<b>33.34%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>551.2</b> Remittances per Capita (USD)	<b>24.2</b> Businesses per 1,000 persons	<b>18,140</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>9.42%</b> Protected Land	<b>2.22%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>11.2</b> Hospital Beds per 10,000 Persons	<b>8.11</b> Nurses per 10,000 Persons	<b>7.89</b> Physicians per 10,000 Persons	<b>14.2Km</b> Average Distance to Nearest Hospital	<b>85.4%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>10.1%</b> Households with Access to Fixed Phone Line	<b>82.1%</b> Households with Access to Mobile Phone	<b>99.1%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>15.8 km</b> Average Distance to Nearest Port or Airport	<b>35.0 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>94</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>95</sup> Rank: 19 of 22 Departments (Score: 0.410)**

Quetzaltenango's score and ranking are due to moderate Vulnerability combined with very high Coping Capacity scores.

Table 70. The 3 thematic areas with the weakest relative scores



**Gender Inequality**



**Economic Constraints**



**Vulnerable Health Status**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>96</sup> Rank: 14 of 22 Departments (Score: 0.505)**

Quetzaltenango's score and ranking are due to very high Multi-Hazard Exposure combined with moderate Vulnerability and very high Coping Capacity scores.

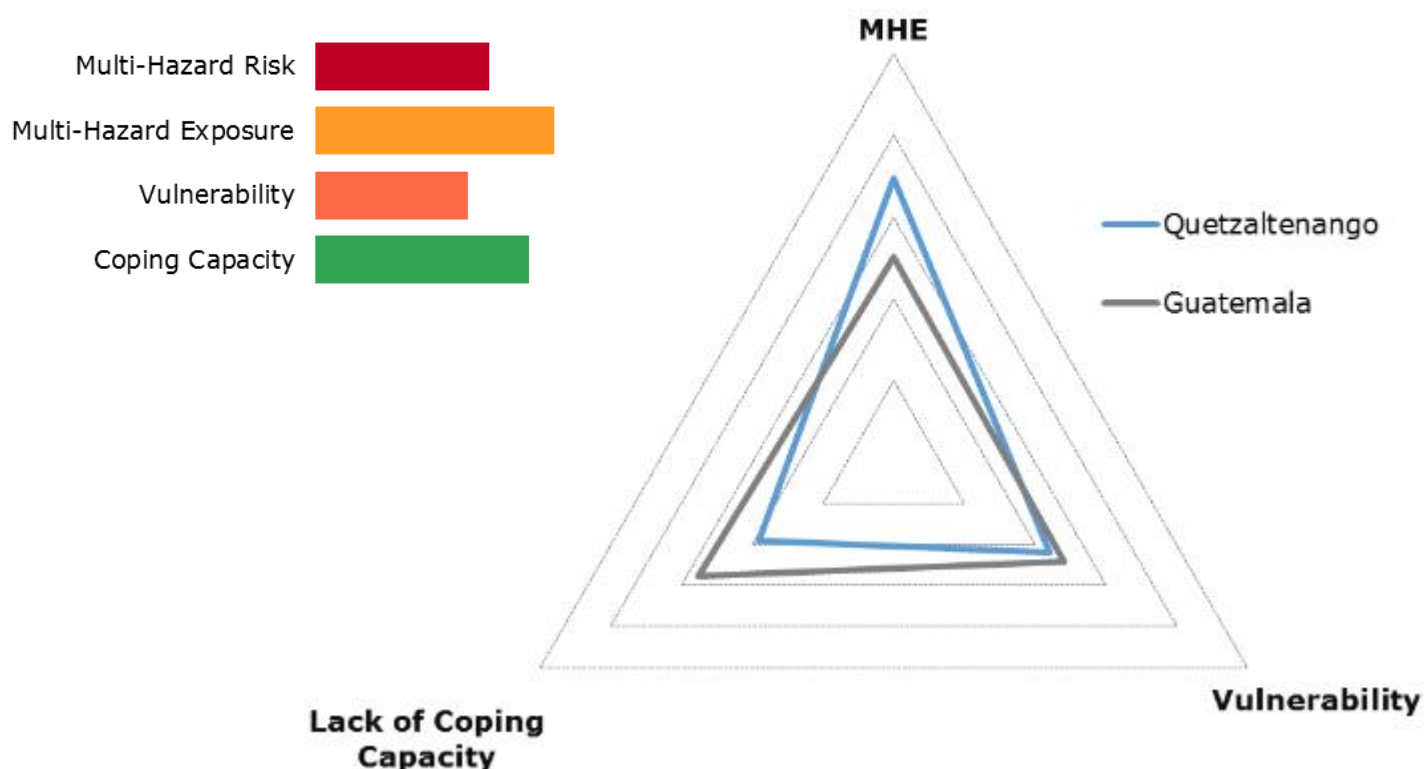


Figure 54. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>95</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>96</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Highest economic capacity

Ranked 1 of 22 departments, high economic capacity indicates that Quetzaltenango may be able to invest in additional mitigation and preparedness measures at the local and community level.



### Low population pressures

Ranked 19 of 22 departments, limited population change allows disaster managers to form accurate evacuation, sheltering, and resource plans.



### Low clean water vulnerability

Ranked 18 of 22 departments, low clean water vulnerability indicates that a population has access to high water quality and good containment systems, reducing susceptibility to disaster.

## Recommendations

01

### Provide opportunities for women

Public education and awareness programs, as well as increased business and political opportunities that focus on advancing the role of women in the workplace and society, will increase the resilience of vulnerable populations.

02

### Increased economic opportunity

Provide education and government-backed incentivized business programs to promote business development and growth, ultimately decreasing vulnerability within the department.

03

### Increase health education

Provide health-education services for the population, especially new mothers and other special needs populations.

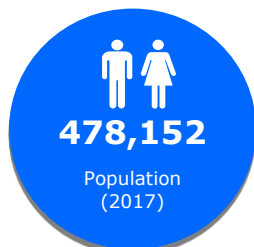
## Department: Izabal



Department Capital: Puerto Barrios

Area: 9,038 km<sup>2</sup>

Izabal is in eastern Guatemala and is bordered to the east by the Gulf of Honduras. The department surrounds Lago Izabal, the country's largest lake, which bisects the department. Puerto Barrios is the main Caribbean Sea port for Guatemala.



Municipality	Population
Morales	129,415
Puerto Barrios	115,260
El Estor	95,195
Livingston	71,858
Los Amates	66,424



**Multi-Hazard Risk Rank:  
Low (15 of 22)**

**Lack of Resilience Rank:  
Moderate (13 of 22)**

## RVA Component Scores

Table 71. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Low		Moderate		Low		Moderate		Moderate	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.470	15	0.501	13	0.407	16	0.441	12	0.439	10

## Multi-Hazard Exposure (MHE)

**Multi-Hazard Exposure<sup>97</sup> Rank: 16 of 22 Departments (Score: 0.407)**

Table 72. Estimated ambient population<sup>98</sup> exposed to each hazard



**46%**

**189,461 People**

Cyclone



**100%**

**411,371 People**

Earthquake



**0%**

**0 People**

Volcano



**60%**

**245,212 People**

Flood



**<1%**

**223 People**

Landslide

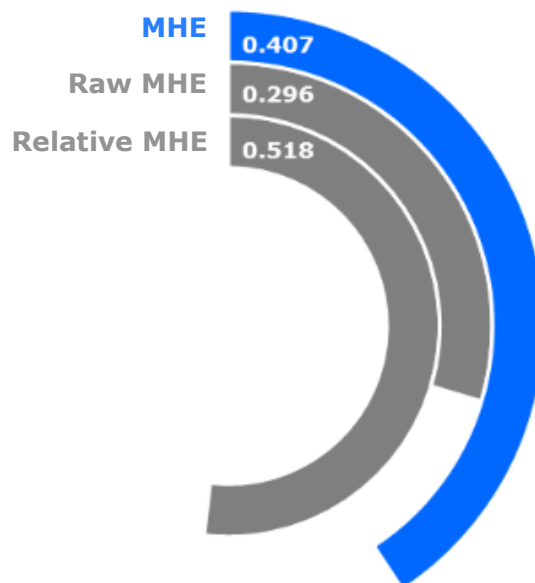
### Guatemala Earthquake of February 4, 1976

One of the most destructive earthquakes ever to strike Guatemala occurred on February 4, 1976. The magnitude 7.5 quake's hypocenter was located at a depth of 5 km near the town of Los Amates in the department of Izabal.

Cities throughout the country suffered damage, and most adobe-type houses in the outlying areas of Guatemala City were completely destroyed. The earthquake struck during the early morning when most people were asleep. This contributed to the high death toll of 23,000. Approximately 76,000 were injured, and many thousands left homeless. Some areas went without electricity and communication for days.

Transportation was impeded by landslides. Food and water supplies were severely reduced. The main shock was followed by thousands of aftershocks, some of the larger ones causing additional loss of life and damage.

<https://worldhistoryproject.org/1976/2/4/guatemala-earthquake>



<sup>97</sup> **Multi-Hazard Exposure:** Average exposure of the population to hazards.

<sup>98</sup> **Ambient Population:** 24-hour average estimate of the population in each department. Ambient population typically differs from census population.



## Vulnerability (V)

**Vulnerability<sup>99</sup> Rank: 12 of 22 Departments (Score: 0.441)** Vulnerability in Izabal is primarily driven by Vulnerable Health Status and Economic Constraints. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Vulnerability score.

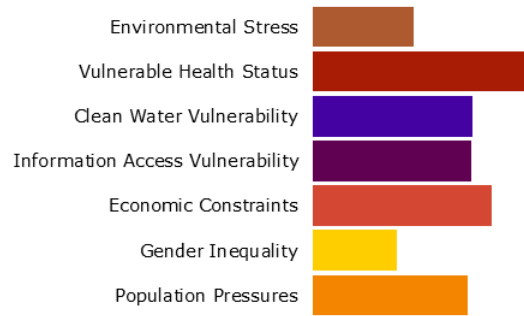









Table 73. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>3.2%</b> Province at Drought Risk	<b>-1.5%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>23</b> Infant Mortality Rate	<b>224.4</b> Maternal Mortality Ratio	<b>1.2%</b> Acute Malnutrition	<b>1.5%</b> Population Disabled	<b>14.2</b> TB Incidence	<b>20.3</b> Dengue Prevalence	<b>17.2</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>68.6%</b> Households with Access to Improved Water	<b>62.6%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>16.9%</b> Adult Illiteracy	<b>5.9</b> Average Years of Schooling	<b>77.1%</b> Primary School Enrollment	<b>6.5%</b> Households with Internet	<b>48.8%</b> Households with Cable TV	<b>76.5%</b> Households with Radio	<b>26.9%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.80</b> Economic Dependency Ratio	<b>59.9%</b> Population in Poverty	<b>0.51</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>33.3%</b> Female Seats in Congress	<b>0.04</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.08</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>3.5%</b> Average Annual Population Change	<b>2.4%</b> Average Annual Urban Population Change	<b>43.2%</b> Food Insecurity				

<sup>99</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country’s normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>100</sup> Rank: 10 of 22 Departments (Score: 0.439)** Izabal displays a moderate level of Coping Capacity, which is attributable to low Infrastructure Capacity and moderate Economic and Environmental Capacities. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Coping Capacity score.

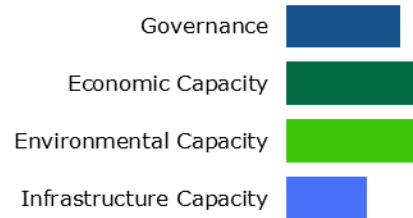


Table 74. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>298.3</b> Crime Victims per 100K	<b>15.3%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$556.0</b> Remittances per Capita (USD)	<b>15.7</b> Businesses per 1,000 persons	<b>13,360.5</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>30.5%</b> Protected Land	<b>1.6%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>5.0</b> Hospital Beds per 10,000 Persons	<b>3.2</b> Nurses per 10,000 Persons	<b>2.55</b> Physicians per 10,000 Persons	<b>42.9 km</b> Average Distance to Nearest Hospital	<b>90.6%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>9.7%</b> Households with Access to Fixed Phone Line	<b>73.5%</b> Households with Access to Mobile Phone	<b>85.3%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>20.4 km</b> Average Distance to Nearest Port or Airport	<b>8.7 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>100</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>101</sup> Rank: 13 of 22 Departments (Score: 0.501)**

Izabal's score and ranking are due to moderate Vulnerability and Coping Capacity scores.

Table 75. The 3 thematic areas with the weakest relative scores



**Vulnerable Health Status**



**Economic Constraints**



**Infrastructure Capacity**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>102</sup> Rank: 15 of 22 Departments (Score: 0.470)**

Izabal's score and ranking are due to low Multi-Hazard Exposure combined with moderate Vulnerability and Coping Capacity scores.

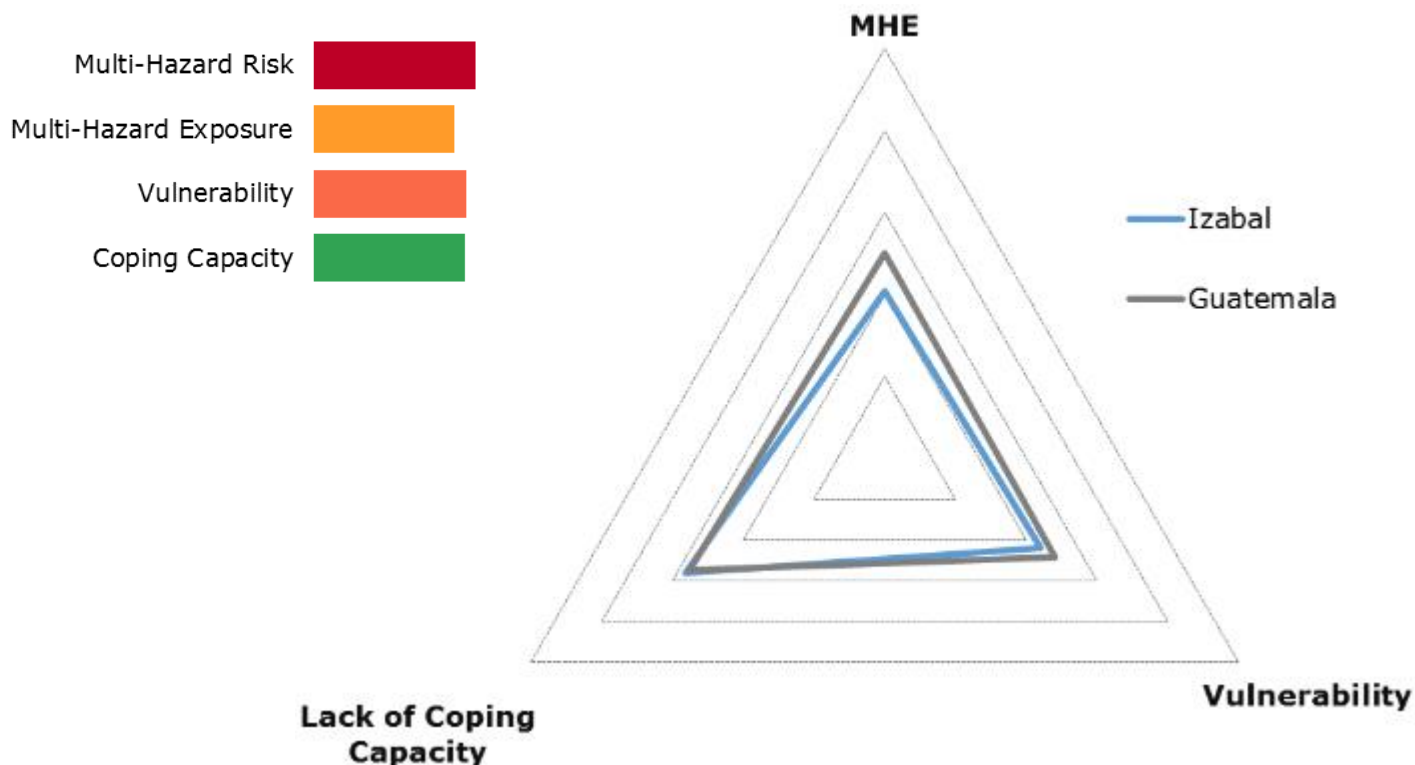


Figure 55. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>101</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>102</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Lowest gender inequality

Ranked 22 of 22 departments, low gender inequality indicates that vulnerable populations are more likely to have their needs met under 'normal' conditions and may be less susceptible during times of disaster.



### Low environmental stress

Ranked 17 of 22 departments, low environmental stress indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.

## Recommendations

01

### Invest in public health education

Despite adequate health care infrastructure, health vulnerability is a major factor in Izabal's Vulnerability. By providing education programs to the public, especially young/expectant mothers and special needs populations, vulnerability can be decreased.

02

### Invest in communication infrastructure

Increase access to communications for the population through investments in infrastructure and education. By increasing citizen access to information, disaster managers can provide disaster-related information to a greater percentage of the population.

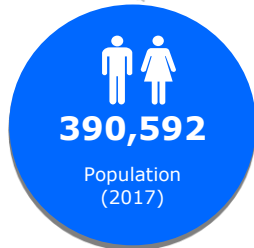
**Department: Santa Rosa**



Department Capital: Cuilapa

Area: 2,295 km<sup>2</sup>

Santa Rosa is in southern Guatemala, bordering the Pacific Ocean, and is characterized by a variety of climates. Agricultural products include livestock and coffee. The department is known for its cheeses and butters.



**Municipality**

Municipality	Population
Chiquimulilla	51,564
Barberena	50,562
Cuilapa	48,147
Nueva Santa Rosa	34,588
Pueblo Nuevo Viñas	27,592
Oratorio	27,225
Casillas	26,504
Taxisco	23,827
Santa María Ixhuatán	22,483
Santa Rosa de Lima	20,201
Guazacapán	16,188
San Rafael Las Flores	15,627
Santa Cruz Naranjo	15,008
San Juan Tecuaco	11,078



**Multi-Hazard Risk Rank: Low (16 of 22)**

**Lack of Resilience Rank: Low (16 of 22)**

**RVA Component Scores**

Table 76. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Low		Low		Moderate		Very Low		Moderate	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.469	16	0.492	16	0.425	14	0.397	19	0.414	13

## Multi-Hazard Exposure (MHE)

**Multi-Hazard Exposure<sup>103</sup> Rank: 14 of 22 Departments (Score: 0.425)**

Table 77. Estimated ambient population<sup>104</sup> exposed to each hazard



Cyclone

**100%**

**393,688 People**



Earthquake

**100%**

**393,688 People**



Volcano

**0%**

**0 People**



Flood

**13%**

**50,329 People**



Landslide

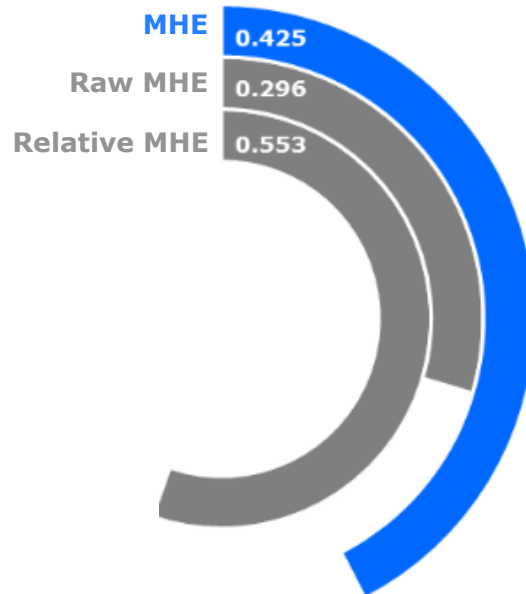
**2%**

**7,507 People**

### A String of Disasters

In August and September 2011, Santa Rosa suffered a string of natural disasters devastating the region. Rainfall 40% above normal in August, according to INSIVUMEH, caused the San Juan River to overflow its banks and created avalanches and landslides cutting off villages and killing four residents. In September, six earthquakes struck Guatemala ranging from 4.5 to 5.8 magnitude on the Richter scale. The southeastern area of Santa Rosa was the most impacted by earthquakes, with almost 5,000 people affected and more than 1,200 houses damaged. CONRED set up nine refuge centers for 3,500 people.

<http://www.americasquarterly.org/node/2926>



<sup>103</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>104</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>105</sup> Rank: 19 of 22 Departments (Score: 0.397)** Vulnerability in Santa Rosa is influenced by Clean Water Vulnerability and Economic Constraints. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

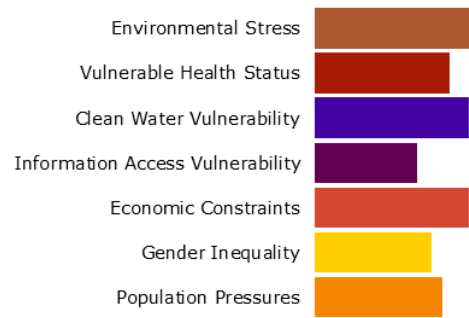









Table 78. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>26.4%</b> Province at Drought Risk	<b>-2.5%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>18</b> Infant Mortality Rate	<b>46.2</b> Maternal Mortality Ratio	<b>0.6%</b> Acute Malnutrition	<b>2.8%</b> Population Disabled	<b>12.0</b> TB Incidence	<b>7.6</b> Dengue Prevalence	<b>20.7</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>69.0%</b> Households with Access to Improved Water	<b>64.8%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>4.7%</b> Adult Illiteracy	<b>5.4</b> Average Years of Schooling	<b>87.3%</b> Primary School Enrollment	<b>3.3%</b> Households with Internet	<b>43.0%</b> Households with Cable TV	<b>80.3%</b> Households with Radio	<b>3.0%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.81</b> Economic Dependency Ratio	<b>54.3%</b> Population in Poverty	<b>0.48</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>33.3%</b> Female Seats in Congress	<b>0.02</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.21</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>1.8%</b> Average Annual Population Change	<b>0.1%</b> Average Annual Urban Population Change	<b>58.7%</b> Food Insecurity				

<sup>105</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>106</sup> Rank: 13 of 22 Departments (Score: 0.414)** Santa Rosa displays a moderate level of Coping Capacity, which is attributable to low Governance and Environmental Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

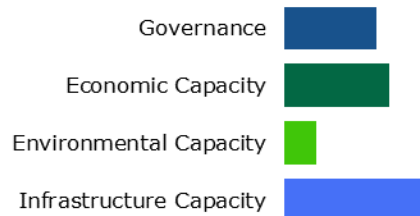


Table 79. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>275.3</b> Crime Victims per 100K	<b>20.6%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$517.8</b> Remittances per Capita (USD)	<b>10.7</b> Businesses per 1,000 Persons	<b>11,760</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>3.0%</b> Protected Land	<b>0.5%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>12.9</b> Hospital Beds per 10,000 Persons	<b>6.1</b> Nurses per 10,000 Persons	<b>6.5</b> Physicians per 10,000 Persons	<b>25.2 km</b> Average Distance to Nearest Hospital	<b>85%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>4.1%</b> Households with Access to Fixed Phone Line	<b>88.5%</b> Households with Access to Mobile Phone	<b>97.1%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>31.2 km</b> Average Distance to Nearest Port or Airport	<b>23.2 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>106</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.



## Lack of Resilience (LR)

**Lack of Resilience<sup>107</sup> Rank: 16 of 22 Departments (Score: 0.492)**

Santa Rosa's score and ranking are due to very low Vulnerability combined with moderate Coping Capacity scores.

Table 80. The 3 thematic areas with the weakest relative scores



**Clean Water  
Vulnerability**



**Economic  
Capacity**



**Economic  
Constraints**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>108</sup> Rank: 16 of 22 Departments (Score: 0.469)**

Santa Rosa's score and ranking are due to moderate Multi-Hazard Exposure combined with very low Vulnerability and moderate Coping Capacity scores.

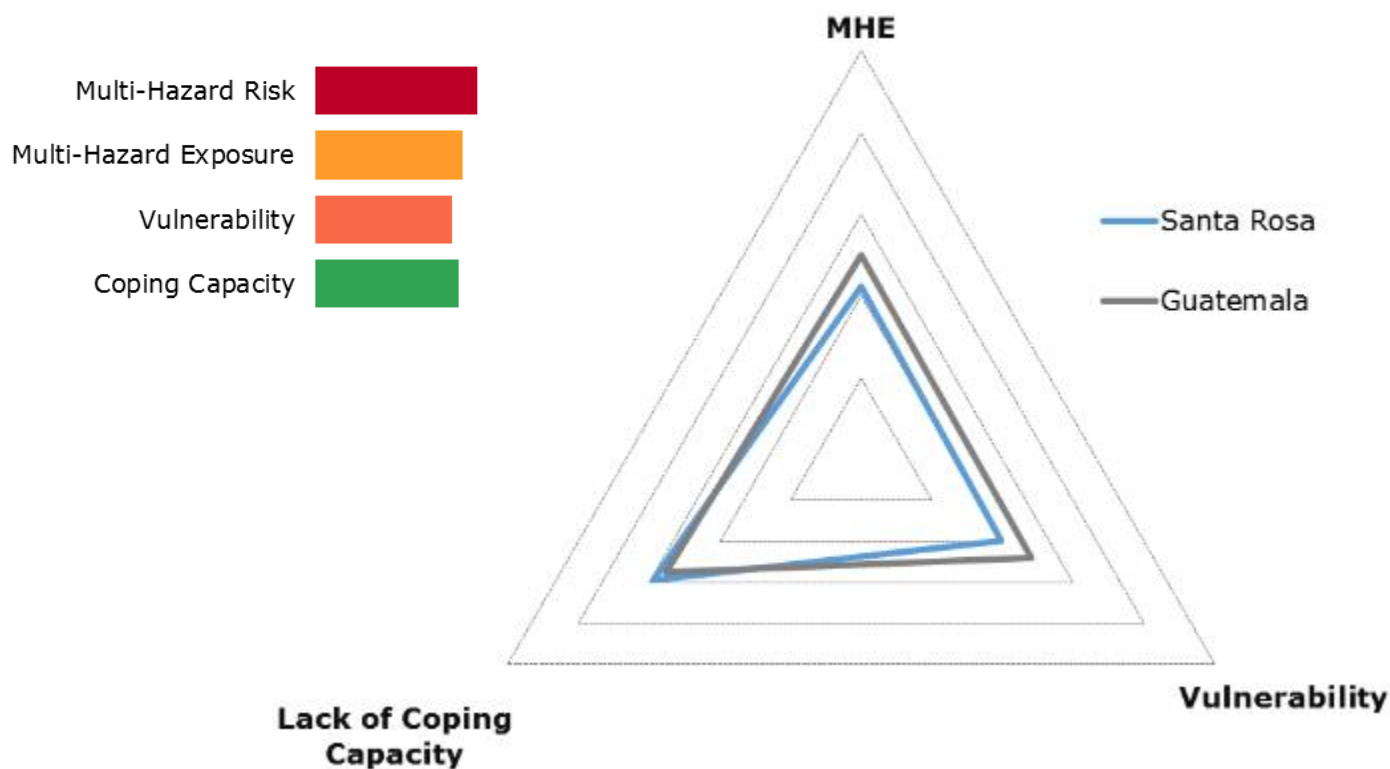


Figure 56. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>107</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>108</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Low gender inequality

Ranked 21 of 22 departments, low gender inequality indicates that vulnerable populations are more likely to have their needs met under 'normal' conditions and may be less susceptible during times of disaster.



### High information access

High information access indicates that the population has an increased ability to access and comprehend disaster-related information before, during, and after events.



### High health care capacity

Ranked 3 of 22 departments, high health care capacity indicates that the population will have access to healthcare services before, during, and after a disaster.

## Recommendations

01

### Provide business opportunities and education

Institute programs to provide independent economic opportunities in the department. Increased economic capacity will decrease vulnerability in emergencies.

02

### Increase government water services

Investments in public water and sewer facilities will help to decrease vulnerability and increase access to clean water during a disaster.

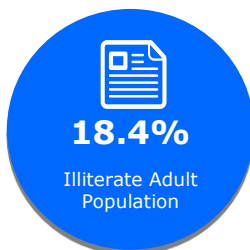
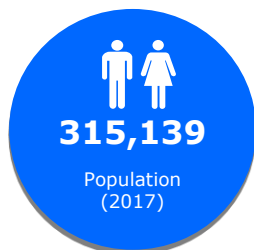
**Department: Baja Verapaz**



Department Capital: Salamá

Area: 3,124 km<sup>2</sup>

Baja Verapaz is in central Guatemala to the north of Guatemala City. The region is dominated by the Chuacús Mountains and the economy is based on sugar cane, vegetables and grain production.



Municipality	Population
Cubulco	73,445
Purulhá	62,020
Salamá	61,882
Rabinal	39,386
San Miguel Chicaj	31,190
San Jerónimo	25,932
Granados	11,574
El Chol	9,710



**Multi-Hazard Risk Rank: Low (17 of 22)**

**Lack of Resilience Rank: Low (15 of 22)**

**RVA Component Scores**

Table 81. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Low		Low		Low		Moderate		High	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.469	17	0.497	15	0.413	15	0.500	9	0.507	7

## Multi-Hazard Exposure (MHE)

**Multi-Hazard Exposure<sup>109</sup> Rank: 15 of 22 Departments (Score: 0.413)**

Table 82. Estimated ambient population<sup>110</sup> exposed to each hazard



Cyclone

**11%**

**31,853 People**



Earthquake

**100%**

**283,423 People**



Volcano

**96%**

**272,953 People**



Flood

**10%**

**28,128 People**



Landslide

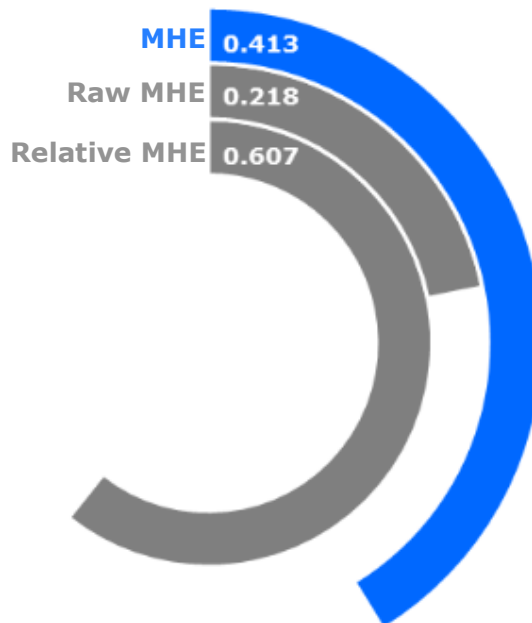
**11%**

**31,296 People**

### The Quetzal Biotope (a.k.a. Mario Dary Rivera Nature Reserve)

The Quetzal Biotope, officially known as the Mario Dary Rivera Nature Reserve, is one of the most fascinating nature reserves in Guatemala, protecting 3,000 acres of cloud forest and many species of flowers, butterflies, and birds, including the national bird, the quetzal. Established in 1977 to protect Guatemala's rapidly shrinking cloud forest and its inhabitants, the nature reserve has been under the administration of the San Carlos University, which has made the Quetzal Biotope one of the country's top destinations for nature lovers and bird watchers.

<http://www.sailing-diving-guatemala.com/guatemala/quetzal-biotope.php>



<sup>109</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>110</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>111</sup> Rank: 9 of 22 Departments (Score: 0.500)** Vulnerability in Baja Verapaz is primarily driven by Information Access Vulnerability and Gender Inequality. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

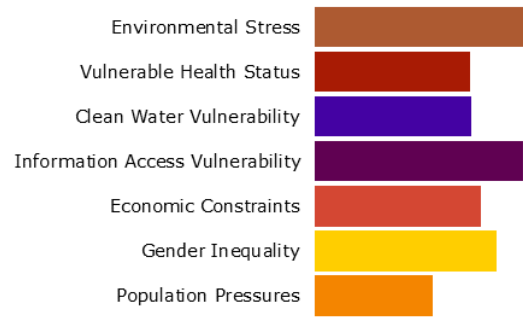









Table 83. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>70.5%</b> Province at Drought Risk	<b>-1.5%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>22</b> Infant Mortality Rate	<b>137.9</b> Maternal Mortality Ratio	<b>0.6%</b> Acute Malnutrition	<b>7.6%</b> Population Disabled	<b>7.5</b> TB Incidence	<b>4.1</b> Dengue Prevalence	<b>26.3</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>82.9%</b> Households with Access to Improved Water	<b>45.8%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>18.4%</b> Adult Illiteracy	<b>5.0</b> Average Years of Schooling	<b>79.5%</b> Primary School Enrollment	<b>2.9%</b> Households with Internet	<b>36.9%</b> Households with Cable TV	<b>78.4%</b> Households with Radio	<b>55.8%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.90</b> Economic Dependency Ratio	<b>66.3%</b> Population in Poverty	<b>0.42</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>50.0%</b> Female Seats in Congress	<b>0.15</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.22</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>2.9%</b> Average Annual Population Change	<b>1.8%</b> Average Annual Urban Population Change	<b>40.3%</b> Food Insecurity				

<sup>111</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>112</sup> Rank: 7 of 22 Departments (Score: 0.507)** Baja Verapaz displays a low level of Coping Capacity, which is attributable to low Governance and low Environmental Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Coping Capacity score.

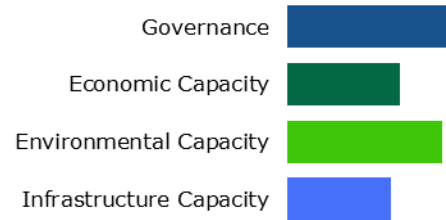


Table 84. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>164.4</b> Crime Victims per 100K	<b>7.1%</b> Households with Garbage Collection				
	<b>Economic Capacity</b>	<b>\$872.3</b> Remittances per Capita (USD)	<b>8.3</b> Businesses per 1,000 persons	<b>7,174</b> GDP per Capita (Quetzales)			
	<b>Environmental Capacity</b>	<b>14.4%</b> Protected Land	<b>3.5%</b> Reforested Area				
	<b>Infrastructure Capacity</b>						
	<b>Health Care Capacity</b>	<b>7.0</b> Hospital Beds per 10,000 Persons	<b>2.1</b> Nurses per 10,000 Persons	<b>2.1</b> Physicians per 10,000 Persons	<b>18.6 km</b> Average Distance to Nearest Hospital	<b>87.7%</b> Children Completed Immunization Schedule	
	<b>Communications Capacity</b>	<b>1.7%</b> Households with Access to Fixed Phone Line	<b>82.6%</b> Households with Access to Mobile Phone	<b>82.3%</b> Households with Access to Electricity			
	<b>Transportation Capacity</b>	<b>37.7 km</b> Average Distance to Nearest Port or Airport	<b>24.8 km</b> Total Length of Road per 100 km <sup>2</sup> (area)				

<sup>112</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>113</sup> Rank: 15 of 22 Departments (Score: 0.497)**

Baja Verapaz’s score and ranking are due to moderate Vulnerability combined with high Coping Capacity scores.

Table 85. The 3 thematic areas with the weakest relative scores



**Gender Inequality**



**Information Access Vulnerability**



**Governance**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>114</sup> Rank: 17 of 22 Departments (Score: 0.469)**

Baja Verapaz’s score and ranking are due to low Multi-Hazard Exposure combined with moderate Vulnerability and high Coping Capacity scores.

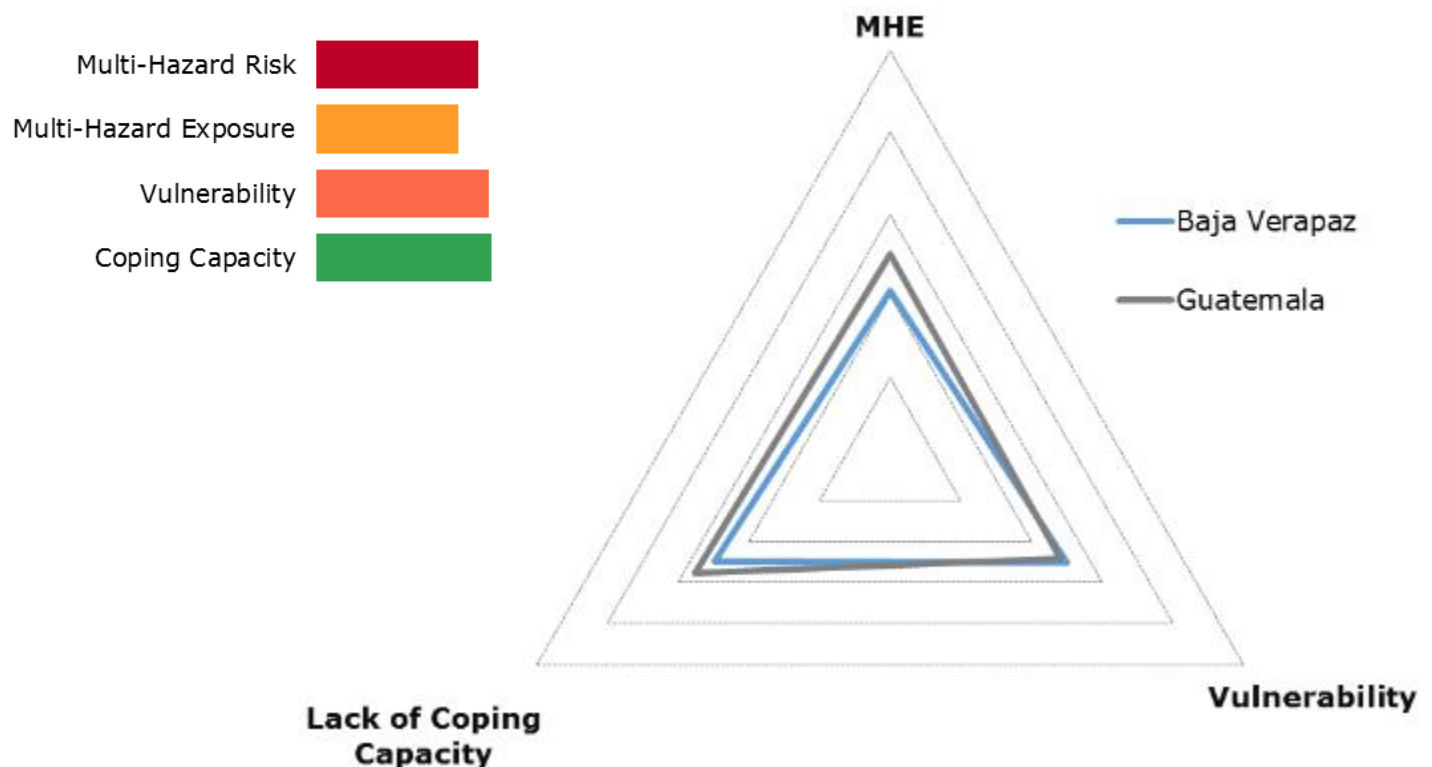


Figure 57. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>113</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country’s normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>114</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country’s normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### High overall governance

Ranked 2 of 22 departments, high governance could facilitate the implementation of disaster management initiatives into departmental and municipal communities.



### High environmental capacity

Ranked 3 of 22 departments, high environmental capacity indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.



### Low economic constraints

Ranked 15 of 22 departments, low economic constraints indicate an increased ability to invest in mitigation and preparedness measures at the individual, household, and department level.

## Recommendations

01

### Provide opportunities for women

Public education and awareness programs that focus on increasing the role of women in the workplace and the society will improve resilience and decrease vulnerability.

02

### Increase information accessibility

Increase access to information for the population through investments in infrastructure and education. By increasing citizen access to information, disaster managers can provide disaster-related information to a greater percentage of the population.

03

### Increase government services

Investments in public services such as garbage collection, fire, and police will increase coping capacity and the department's ability to handle crises.



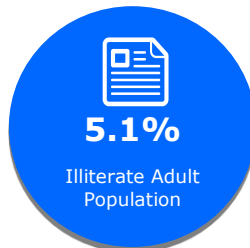
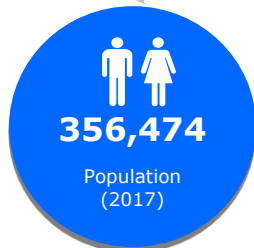
**Department: Sacatepéquez**



Department Capital: Antigua

Area: 464.9 km<sup>2</sup>

Sacatepéquez is to the northwest of Guatemala City and is a very mountainous area. The department is home to the most active volcanoes in Guatemala, including Acatengo, Volcán de Agua, and Volcán de Fuego.



**Municipality**

- Antigua Guatemala
- Sumpango
- Ciudad Vieja
- Alotenango
- Santiago Sacatepéquez
- San Lucas Sacatepéquez
- Jocotenango
- Santa Lucía Milpas Altas
- Santa María de Jesús
- Pastores
- San Miguel Dueñas
- Magdalena Milpas Altas
- Santo Domingo Xenacoj
- San Antonio Aguas Calientes
- San Bartolomé
- Santa Catarina Barahona

**Population**

- 46,534
- 41,789
- 40,676
- 33,824
- 32,656
- 28,221
- 21,242
- 17,433
- 17,347
- 16,439
- 12,218
- 11,933
- 11,313
- 10,771
- 10,422
- 3,654



**Multi-Hazard Risk Rank: Low (18 of 22)**

**Lack of Resilience Rank: Very Low (22 of 22)**

**RVA Component Scores**

Table 86. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Low		Very Low		High		Very Low		Very High	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.467	18	0.359	22	0.682	6	0.332	21	0.613	2

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>115</sup> Rank: 6 of 22 Departments (Score: 0.682)

Table 87. Estimated ambient population<sup>116</sup> exposed to each hazard



Cyclone

**100%**

**325,051 People**



Earthquake

**100%**

**325,051 People**



Volcano

**100%**

**325,051 People**



Flood

**19%**

**62,918 People**



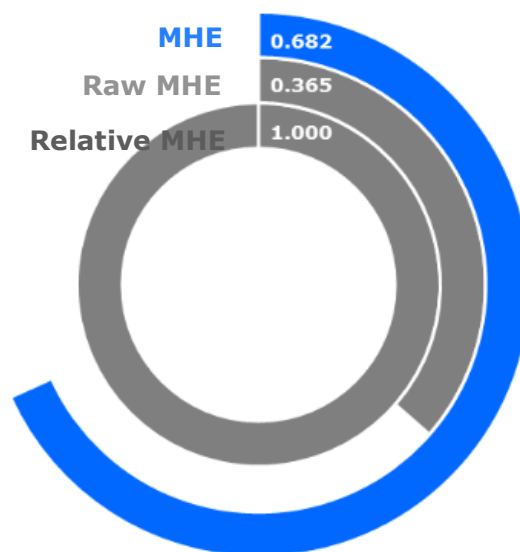
Landslide

**10%**

**31,193 People**

### Volcán de Fuego

On the border of Sacatepéquez, Chimaltenango, and Escuintla departments, Volcán de Fuego is Central America's most active volcano. Fuego is almost constantly active at a low level with smoke visible emanating from its top daily. While large eruptions are rare, Sacatepéquez department's capital city of Antigua sitting in the volcano's shadow is constantly aware of the potential danger. The last major eruption was in 1974, but smaller eruptions have blanketed area towns and crops in ash as recently as 2017.



<sup>115</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>116</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>117</sup> Rank: 21 of 22 Departments (Score: 0.332)** Vulnerability in Sacatepéquez is very low, but is influenced by Environmental Stress, Vulnerable Health Status, and Gender Inequality. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

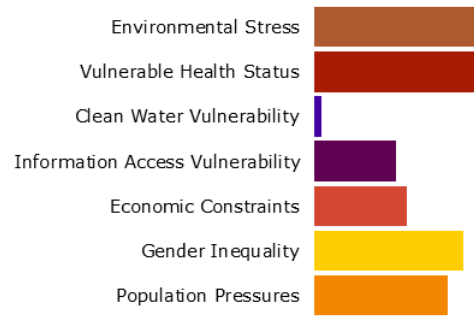









Table 88. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>73.2%</b> Province at Drought Risk	<b>0.8%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>29</b> Infant Mortality Rate	<b>64.3</b> Maternal Mortality Ratio	<b>0.9%</b> Acute Malnutrition	<b>1.0%</b> Population Disabled	<b>9.5</b> TB Incidence	<b>6.8</b> Dengue Prevalence	<b>22.6</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>94.9%</b> Households with Access to Improved Water	<b>89.9%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>5.1%</b> Adult Illiteracy	<b>6.7</b> Average Years of Schooling	<b>84.7%</b> Primary School Enrollment	<b>10.4%</b> Households with Internet	<b>49.0%</b> Households with Cable TV	<b>84.8%</b> Households with Radio	<b>36.5%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.69</b> Economic Dependency Ratio	<b>41.1%</b> Population in Poverty	<b>0.48</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.05</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.03</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>3.0%</b> Average Annual Population Change	<b>1.3%</b> Average Annual Urban Population Change	<b>46.1%</b> Food Insecurity				

<sup>117</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>118</sup> Rank: 2 of 22 Departments (Score: 0.613)** Sacatepéquez displays a very high level of Coping Capacity, which is attributable to high Economic Capacity, Infrastructure Capacity, and Governance. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Coping Capacity score.

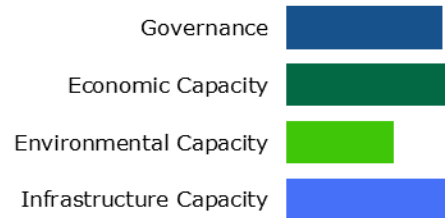


Table 89. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>332.7</b> Crime Victims per 100K	<b>41.3%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$324.0</b> Remittances per Capita (USD)	<b>20.1</b> Businesses per 1,000 persons	<b>19,816</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>17.4%</b> Protected Land	<b>1.4%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>11.0</b> Hospital Beds per 10,000 Persons	<b>6.7</b> Nurses per 10,000 Persons	<b>7.6</b> Physicians per 10,000 Persons	<b>8.4 km</b> Average Distance to Nearest Hospital	<b>91.2%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>10.1%</b> Households with Access to Fixed Phone Line	<b>86.8%</b> Households with Access to Mobile Phone	<b>99.7%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>25.6 km</b> Average Distance to Nearest Port or Airport	<b>36.7 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>118</sup> Coping Capacity: The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>119</sup> Rank: 22 of 22 Departments (Score: 0.359)**

Sacatepéquez's score and ranking are due to very low Vulnerability combined with very high Coping Capacity scores.

Table 90. The 3 thematic areas with the weakest relative scores



**Vulnerable Health Status**



**Environmental Stress**



**Gender Inequality**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>120</sup> Rank: 18 of 22 Departments (Score: 0.467)**

Sacatepéquez's score and ranking are due to high Multi-Hazard Exposure combined with very low Vulnerability and very high Coping Capacity scores.

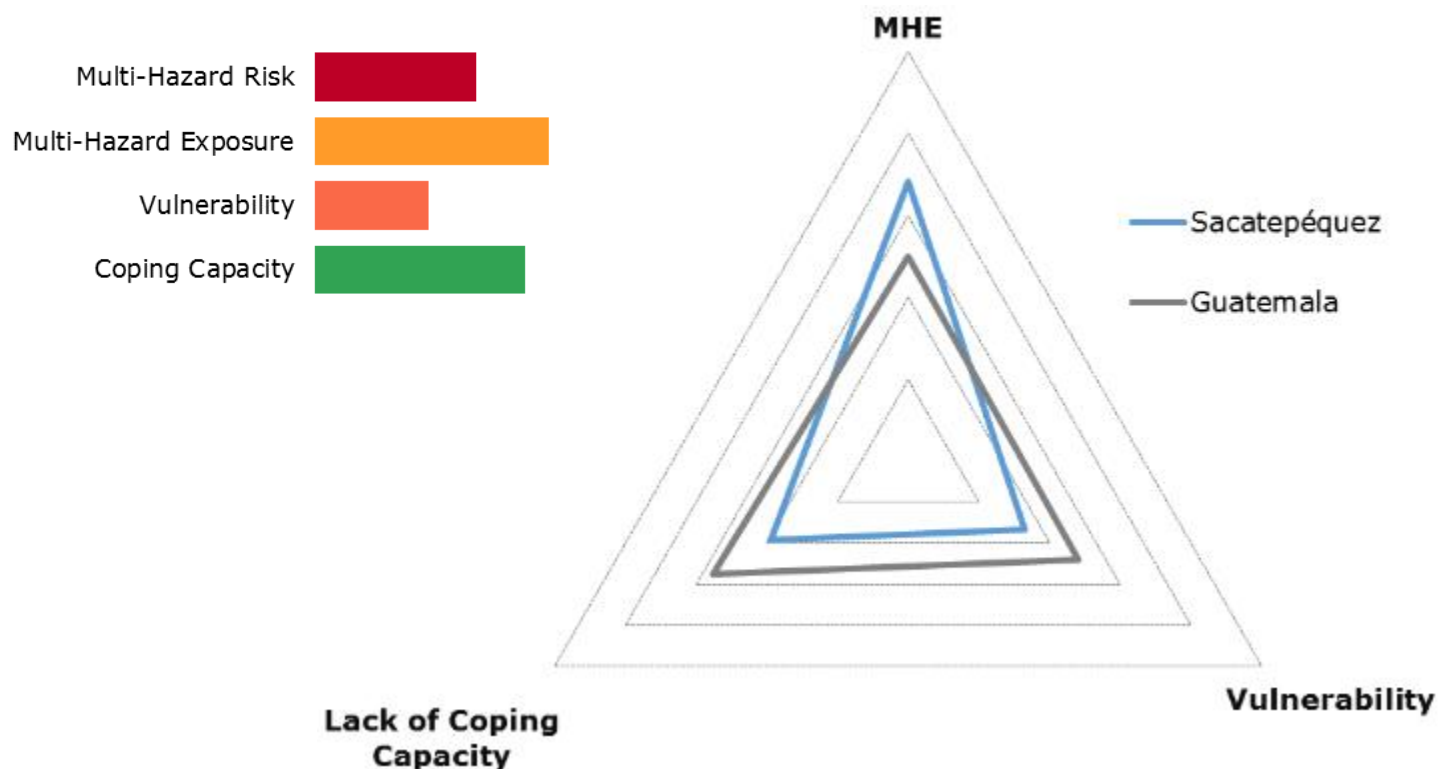


Figure 58. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>119</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>120</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Lowest clean water vulnerability

Ranking 22 of 22 departments, low clean water vulnerability indicates that a population has access to high water quality and good containment systems, reducing susceptibility to disaster.



### Low economic constraints

Ranking 20 of 22 departments, low economic constraints indicate an increased ability to invest in mitigation and preparedness measures at the individual, household, and department level.



### High overall coping capacity

Ranking 2 of 22 departments, high coping capacity indicates the department's ability, using existing skills and resources, to face and manage adverse conditions, emergencies, or disasters.

## Recommendations

01

### Increase health education

Providing education programs to the public, especially young/expectant mothers and special needs populations, vulnerability can be decreased.

02

### Increase environmental programs

Invest in environmental protection programs to preserve land and vegetation, increasing resiliency and coping capacity.

03

### Provide opportunities for women

Public education and awareness programs that focus on increasing the role of women in the workplace and the society will improve resilience and decrease vulnerability.

**Department: Chiquimula**

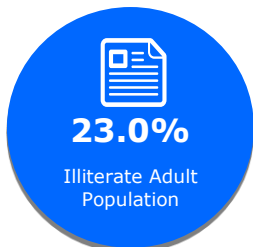
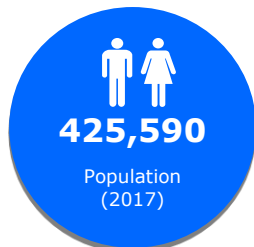


Department Capital: Chiquimula

Area: 2,376 km<sup>2</sup>

Chiquimula is in southeastern Guatemala in the highlands of the Sierra Madre mountain range, and borders Honduras to the southeast. The landscape is comprised of steep mountains, deep ravines, valleys, and wide plains. The region is also known for its maritime and palm-wood crafts sold throughout the country and internationally.

throughout the country and internationally.



**Municipality**

**Population**

Chiquimula	104,525
Jocotán	67,355
Esquipulas	64,835
Camotán	61,038
Quezaltepeque	28,437
Olopa	28,268
Ipala	20,454
San Juan Ermita	14,442
Concepción Las Minas	13,912
San Jacinto	13,550
San José La Arada	8,772



**Multi-Hazard Risk Rank:  
Very Low (19 of 22)**

**Lack of Resilience Rank:  
High (8 of 22)**

**RVA Component Scores**

Table 91. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Very Low		High		Very Low		High		High	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.447	19	0.561	8	0.220	20	0.579	5	0.457	8

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>121</sup> Rank: 20 of 22 Departments (Score: 0.220)

Table 92. Estimated ambient population<sup>122</sup> exposed to each hazard



Cyclone

**29%**

**116,322 People**



Earthquake

**100%**

**408,052 People**



Volcano

**0%**

**0 People**



Flood

**9%**

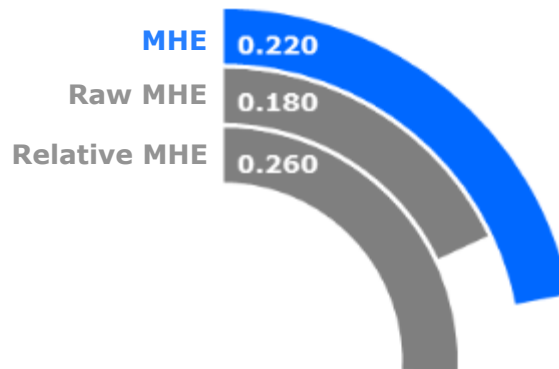
**37,005 People**



Landslide

**2%**

**7,854 People**



<sup>121</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>122</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.



## Vulnerability (V)

**Vulnerability<sup>123</sup> Rank: 5 of 22 Departments (Score: 0.579)** Vulnerability in Chiquimula is primarily driven by Gender Inequality and Environmental Stress. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

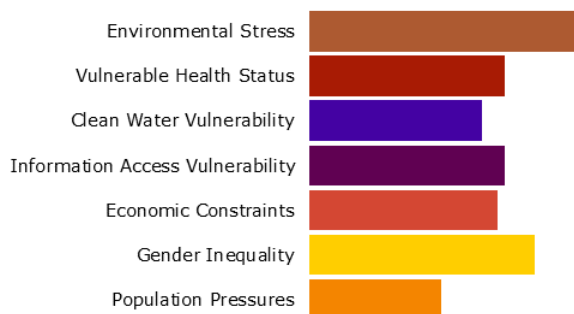









Table 93. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>61.2%</b> Province at Drought Risk	<b>-4.7%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>51</b> Infant Mortality Rate	<b>118.1</b> Maternal Mortality Ratio	<b>0.4%</b> Acute Malnutrition	<b>1.9%</b> Population Disabled	<b>12.1</b> TB Incidence	<b>13.6</b> Dengue Prevalence	<b>19.2</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>73.2%</b> Households with Access to Improved Water	<b>51.7%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>23.0%</b> Adult Illiteracy	<b>4.1</b> Average Years of Schooling	<b>84.4%</b> Primary School Enrollment	<b>4.6%</b> Households with Internet	<b>28.3%</b> Households with Cable TV	<b>75.1%</b> Households with Radio	<b>7.1%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.88</b> Economic Dependency Ratio	<b>70.6%</b> Population in Poverty	<b>0.45</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.07</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.21</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>2.6%</b> Average Annual Population Change	<b>1.7%</b> Average Annual Urban Population Change	<b>47.0%</b> Food Insecurity				

<sup>123</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>124</sup> Rank: 8 of 22 Departments (Score: 0.457)** Chiquimula displays a low level of Coping Capacity, which is attributable to low Infrastructure Capacity and low Environmental Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

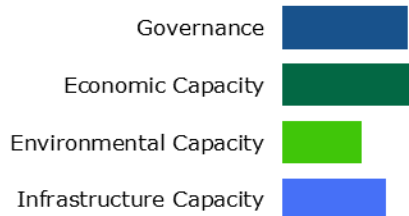


Table 94. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>291.0</b> Crime Victims per 100K	<b>16.0%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$707.8</b> Remittances per Capita (USD)	<b>15.86</b> Businesses per 1,000 persons	<b>9,848</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>9.7%</b> Protected Land	<b>1.0%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>12.2</b> Hospital Beds per 10,000 Persons	<b>2.2</b> Nurses per 10,000 Persons	<b>3.0</b> Physicians per 10,000 Persons	<b>23.8 km</b> Average Distance to Nearest Hospital	<b>93.8%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>6.3%</b> Households with Access to Fixed Phone Line	<b>76.4%</b> Households with Access to Mobile Phone	<b>88.8%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>17.3 km</b> Average Distance to Nearest Port or Airport	<b>27.5 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>124</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>125</sup> Rank: 8 of 22 Departments (Score: 0.561)**

Chiquimula’s score and ranking are due to high Vulnerability combined high Coping Capacity scores.

Table 95. The 3 thematic areas with the weakest relative scores



**Gender Inequality**



**Environmental Stress**



**Infrastructure Capacity**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>126</sup> Rank: 19 of 22 Departments (Score: 0.447)**

Chiquimula’s very low Multi-Hazard Risk is attributable to high Coping Capacity, high Vulnerability, and very low Multi-Hazard Exposure.

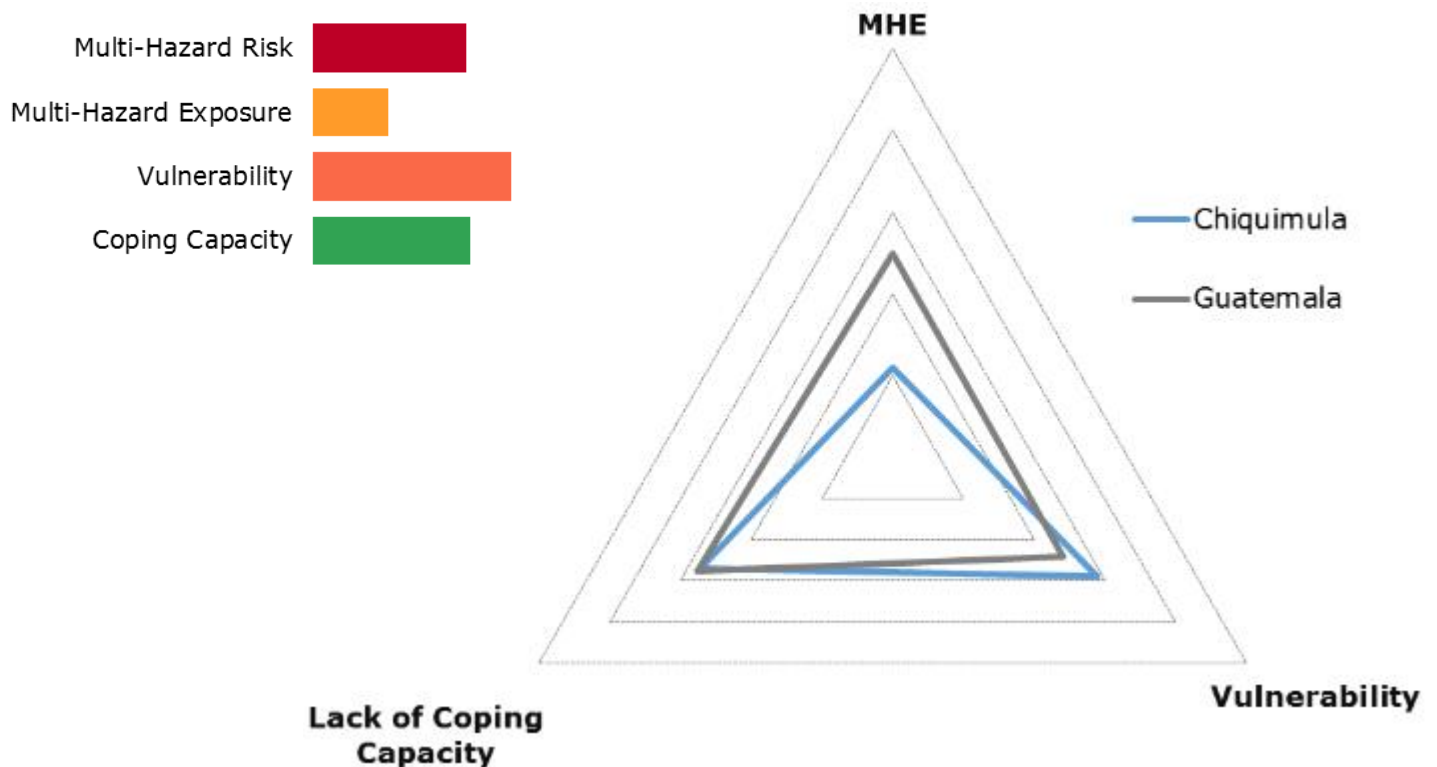


Figure 59. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>125</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country’s normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>126</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country’s normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### High economic capacity

Ranked 8 of 22 departments, high environmental capacity indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.

## Recommendations

01

### Invest in transportation infrastructure

Investing in transportation infrastructure will facilitate the distribution of goods and services before, during, and after a disaster event.

02

### Promote environmental programs

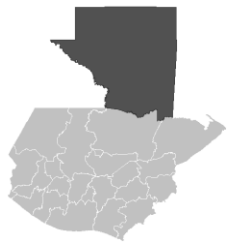
Invest in environmental protection programs to preserve land and vegetation, increasing resiliency and coping capacity.

03

### Provide opportunities for women

Public education and awareness programs that focus on increasing the role of women in the workplace and the society will improve resilience and decrease vulnerability.

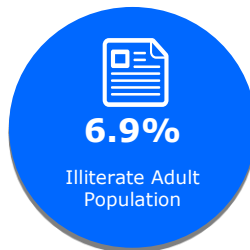
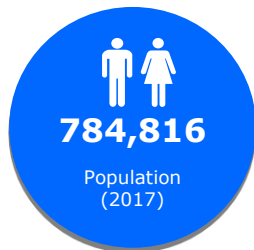
## Department: Petén



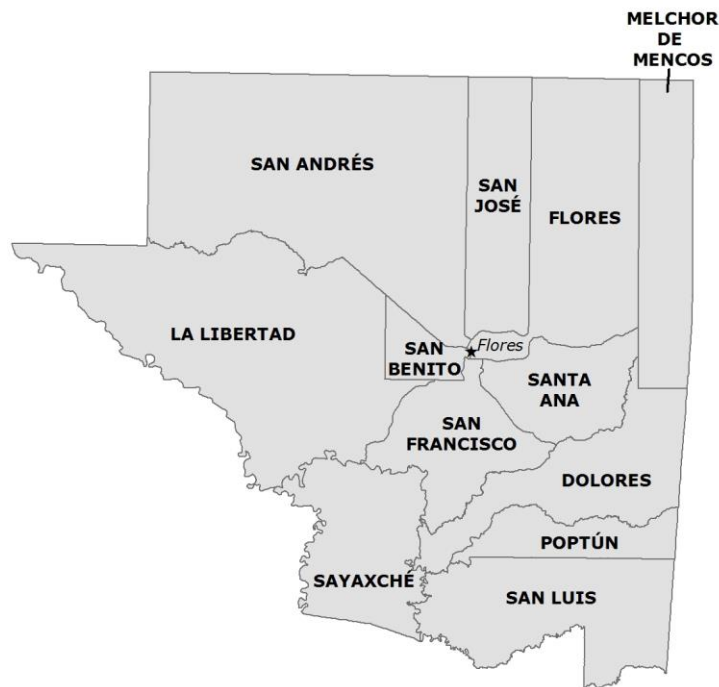
Department Capital: Flores

Area: 35,854 km<sup>2</sup>

Petén is the northernmost and largest department in Guatemala, and borders Mexico to the north and Belize to the east. While Petén has the highest percentage of protected area in the country, illegal logging and farming operations continue to place the protected areas at risk.



Municipality	Population
Sayaxché	141,487
La Libertad	138,236
San Luis	87,031
Poptún	76,941
San Benito	72,447
Flores	70,142
Dolores	55,631
San Andrés	53,333
Santa Ana	40,871
Melchor de Mencos	21,865
San Francisco	20,625
San José	6,208



**Multi-Hazard Risk Rank:  
Very Low (20 of 22)**

**Lack of Resilience Rank:  
Very High (2 of 22)**

### RVA Component Scores

Table 96. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Very Low		Very High		Very Low		Very High		Very Low	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.442	20	0.653	2	0.020	22	0.612	3	0.306	22

## Multi-Hazard Exposure (MHE)

**Multi-Hazard Exposure<sup>127</sup> Rank: 22 of 22 Departments (Score: 0.020)**

Table 97. Estimated ambient population<sup>128</sup> exposed to each hazard



**25%**

**121,426 People**

Cyclone



**25%**

**120,847 People**

Earthquake



**0%**

**0 People**

Volcano



**23%**

**108,750 People**

Flood



**0%**

**0 People**

Landslide

### Balancing Conservation and Progress

The northern third of the Petén Department is protected by the Maya Biosphere Reserve, but deforestation is still common in the area, attributable to growing population and land grabs. Despite its designation as a reserve, pressure continue to rise to develop the area to support the ever-increasing population and food insecurities. Forests are cut down to in a practice known as slash-and-burn agriculture. The forests are chopped down and burned, providing temporarily nutrient-rich ash and soil for crop production. When the soil becomes unproductive, new sections of the forest must be cut down and turned into farmland. The cycle continues, and each year more forests become wasteland.

The southern and central sections of the department are almost completely deforested, which has led to declines in annual rainfall and longer/warmer dry seasons.

<https://www.anywhere.com/guatemala/travel-guide/environmental-issues>



<sup>127</sup> **Multi-Hazard Exposure:** Average exposure of the population to hazards.

<sup>128</sup> **Ambient Population:** 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>129</sup> Rank: 3 of 22 Departments (Score: 0.612)** Vulnerability in Petén is primarily driven by Population Pressures, Gender Inequality, and Clean Water Vulnerability. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

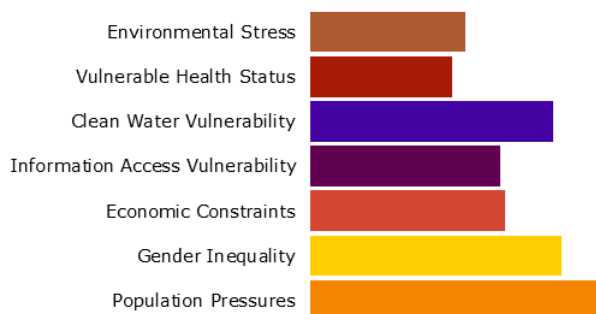









Table 98. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>26.4%</b> Province at Drought Risk	<b>-2.1%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>19</b> Infant Mortality Rate	<b>87.1</b> Maternal Mortality Ratio	<b>0.7%</b> Acute Malnutrition	<b>1.1%</b> Population Disabled	<b>12.9</b> TB Incidence	<b>11.6</b> Dengue Prevalence	<b>11.0</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>67.2%</b> Households with Access to Improved Water	<b>31.6%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>6.9%</b> Adult Illiteracy	<b>5.3</b> Average Years of Schooling	<b>60.5%</b> Primary School Enrollment	<b>5.2%</b> Households with Internet	<b>41.8%</b> Households with Cable TV	<b>73.8%</b> Households with Radio	<b>32.4%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.94</b> Economic Dependency Ratio	<b>60.8%</b> Population in Poverty	<b>0.48</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.10</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.20</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>7.8%</b> Average Annual Population Change	<b>7.6%</b> Average Annual Urban Population Change	<b>46.4%</b> Food Insecurity				

<sup>129</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>130</sup> Rank: 22 of 22 Departments (Score: 0.306)** Petén displays a very low level of Coping Capacity, which is attributable to very low Infrastructure Capacity and very low Governance. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

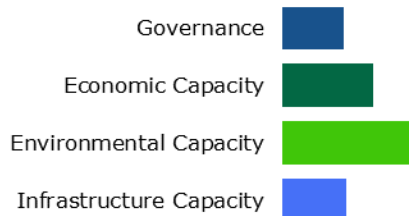









Table 99. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>220.8</b> Crime Victims per 100K	<b>1.9%</b> Households with Garbage Collection				
	<b>Economic Capacity</b>	<b>\$552.1</b> Remittances per Capita (USD)	<b>10.27</b> Businesses per 1,000 persons	<b>8,714.3</b> GDP per Capita (Quetzales)			
	<b>Environmental Capacity</b>	<b>70.2%</b> Protected Land	<b>0.7%</b> Reforested Area				
	<b>Infrastructure Capacity</b>						
	<b>Health Care Capacity</b>		<b>5.5</b> Hospital Beds per 10,000 Persons	<b>1.8</b> Nurses per 10,000 Persons	<b>2.3</b> Physicians per 10,000 Persons	<b>47.0 km</b> Average Distance to Nearest Hospital	<b>100%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>		<b>3.1%</b> Households with Access to Fixed Phone Line	<b>81.6%</b> Households with Access to Mobile Phone	<b>66.6%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>		<b>33.6 km</b> Average Distance to Nearest Port or Airport	<b>4.6 km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>130</sup> Coping Capacity: The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.



## Lack of Resilience (LR)

**Lack of Resilience<sup>131</sup> Rank: 2 of 22 Departments (Score: 0.653)**

Petén’s score and ranking are due to very high Vulnerability combined with very low Coping Capacity scores.

Table 100. The 3 thematic areas with the weakest relative scores



**Gender Inequality**



**Population Pressures**



**Infrastructure Capacity**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>132</sup> Rank: 20 of 22 Departments (Score: 0.442)**

Despite Petén’s very high Vulnerability and very low Coping Capacity, Multi-Hazard Risk is very low due to very low Multi-Hazard Exposure.

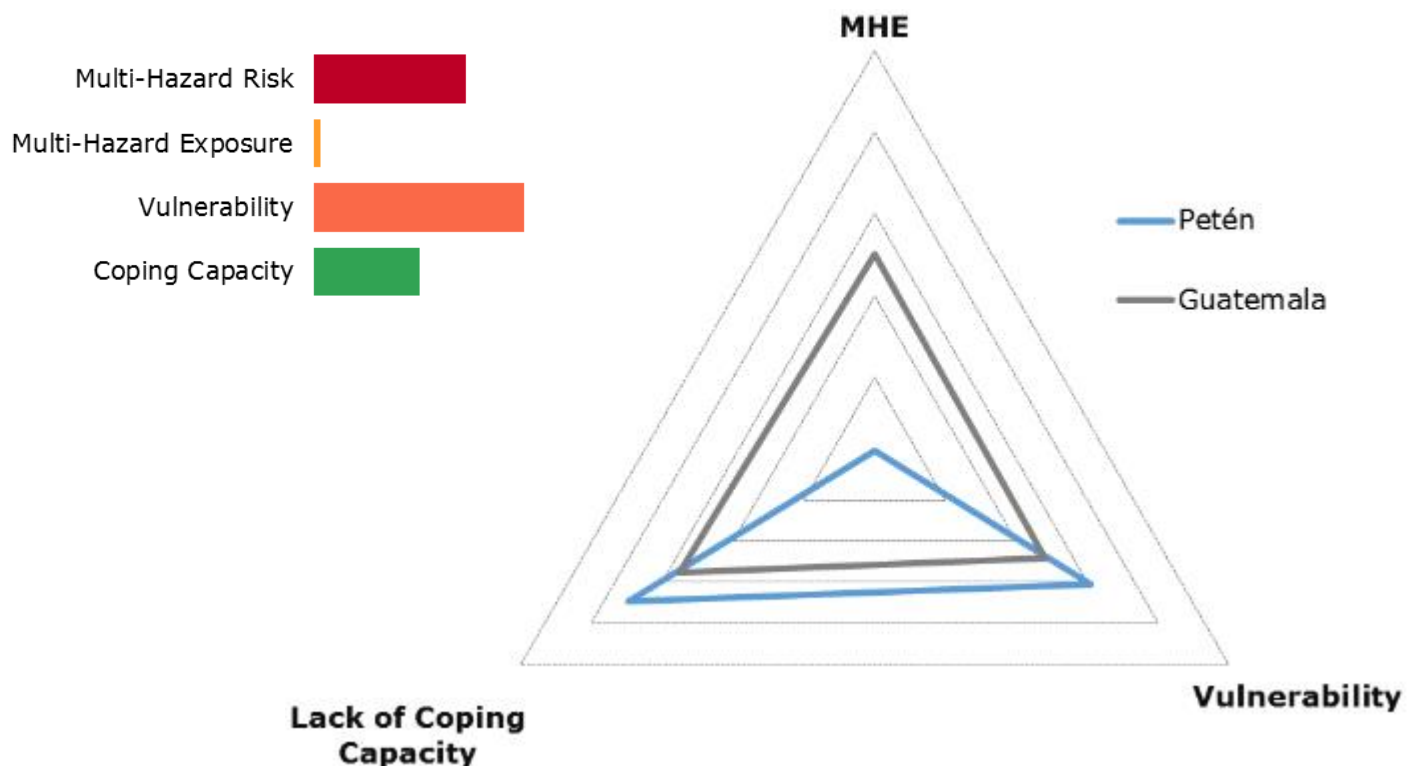


Figure 60. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>131</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country’s normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>132</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country’s normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Low vulnerable health status

Ranked 17 of 22 departments, low health vulnerability could indicate a population that will be more resilient to the negative health impacts associated with major disaster events.



### High environmental capacity

Ranked 6 of 22 departments, high environmental capacity indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.

## Recommendations

01

### Invest in infrastructure

Investing in transportation infrastructure will facilitate the distribution of goods and services before, during, and after a disaster event.

02

### Monitor and manage population influx

Invest in a program to manage population influx into the region. Petén's vast (protected) resources have caused an increase in corporate and individual farming and logging operations. Population-control measures must be enacted to control the influx in personnel as the infrastructure is not designed to handle it.

03

### Provide opportunities for women

Public education and awareness programs that focus on increasing the role of women in the workplace and the society will improve resilience and decrease vulnerability.

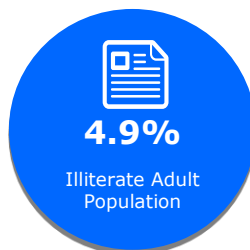
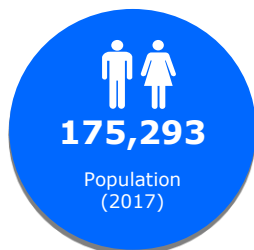
**Department: El Progreso**



Department Capital: Guastatoya

Area: 1,922 km<sup>2</sup>

El Progreso is in eastern Guatemala, and lies between the hot lowlands and cooler Guatemalan Highlands. Approximately 98% of the population is non-indigenous.



Municipality	Population
San Agustín Acasagustlán	43,974
Sanarate	41,995
Guastatoya	25,277
San Antonio la Paz	19,499
Morazán	12,944
Sansare	12,570
El Júcaro	11,392
San Cristobal Acasaguastlán	7,641



**Multi-Hazard Risk Rank:  
Very Low (21 of 22)**

**Lack of Resilience Rank:  
Low (18 of 22)**

**RVA Component Scores**

Table 101. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Very Low		Low		Very Low		Low		Very High	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.360	21	0.411	18	0.257	19	0.421	16	0.598	4

## Multi-Hazard Exposure (MHE)

**Multi-Hazard Exposure<sup>133</sup> Rank: 19 of 22 Departments (Score: 0.257)**

Table 102. Estimated ambient population<sup>134</sup> exposed to each hazard



**46%**

**83,320 People**

Cyclone



**100%**

**182,505 People**

Earthquake



**37%**

**66,775 People**

Volcano



**10%**

**18,688 People**

Flood



**1%**

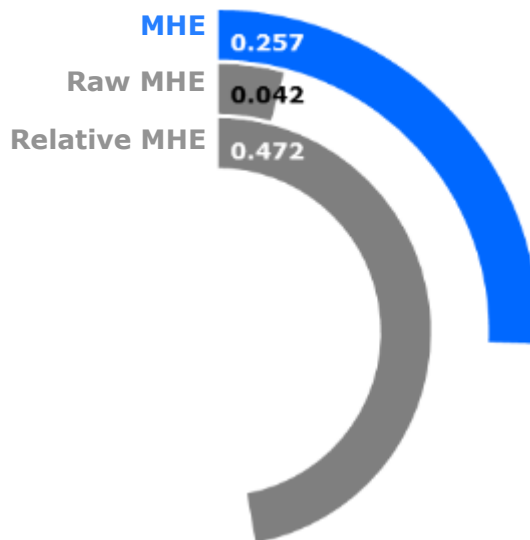
**2,660 People**

Landslide

### Case Study: 'Yo Me Adapto'

A Pan American Development Foundation (PADF) program designed to decrease food instability in the region, "Yo Me Adapto" is designed to teach farmers climate-smart agriculture to adapt to changes in climate and maximize crop yields. With funding from USAID/OFDA, and in partnership with the Universidad del Valle de Guatemala and the Ministry of Agriculture, Livestock and Food, PADF established a demonstration farm to train 1,500 farming families. The center teaches climate-smart agricultural practices such as greenhouses, as well as rain catchment and efficient irrigation systems. Farmers learn how to determine the best varieties of crops to plant, including beans, corn, and sorghum. They also learn methods of soil conservation and the benefits of crop diversification.

<https://www.padf.org/news/2016/5/4/climate-smart-agriculture-program-guatemala>



<sup>133</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>134</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>135</sup> Rank: 16 of 22 Departments (Score: 0.421)** Vulnerability in El Progreso is primarily driven by Environmental Stress, Vulnerable Health Status, and Gender Inequality. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

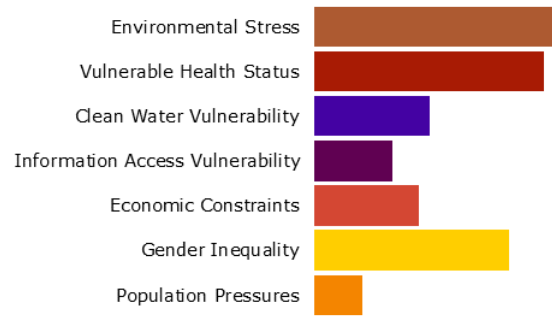









Table 103. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>85.9%</b> Province at Drought Risk	<b>-1.3%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>30</b> Infant Mortality Rate	<b>120.0</b> Maternal Mortality Ratio	<b>1.6%</b> Acute Malnutrition	<b>1.7%</b> Population Disabled	<b>2.4</b> TB Incidence	<b>13.2</b> Dengue Prevalence	<b>45.4</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>80.9%</b> Households with Access to Improved Water	<b>64.8%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>4.9%</b> Adult Illiteracy	<b>6.0</b> Average Years of Schooling	<b>88.4%</b> Primary School Enrollment	<b>5.2%</b> Households with Internet	<b>48.2%</b> Households with Cable TV	<b>81.5%</b> Households with Radio	<b>1.8%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.75</b> Economic Dependency Ratio	<b>53.2%</b> Population in Poverty	<b>0.42</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.01</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.25</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>1.6%</b> Average Annual Population Change	<b>0.6%</b> Average Annual Urban Population Change	<b>37.4%</b> Food Insecurity				

<sup>135</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>136</sup> Rank: 4 of 22 Departments (Score: 0.598)** El Progreso displays a very high level of Coping Capacity, which is attributable to very high Economic Capacity and Infrastructure Capacity. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

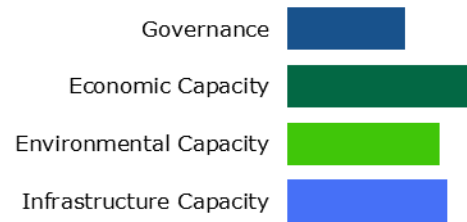


Table 104. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>262.6</b> Crime Victims per 100K	<b>31.9%</b> Households with Garbage Collection			
	<b>Economic Capacity</b>	<b>\$949.6</b> Remittances per Capita (USD)	<b>13.3</b> Businesses per 1,000 persons	<b>15,139</b> GDP per Capita (Quetzales)		
	<b>Environmental Capacity</b>	<b>19.3%</b> Protected Land	<b>3.0%</b> Reforested Area			
	<b>Infrastructure Capacity</b>					
	<b>Health Care Capacity</b>	<b>11.7</b> Hospital Beds per 10,000 Persons	<b>2.2</b> Nurses per 10,000 Persons	<b>3.3</b> Physicians per 10,000 Persons	<b>16.4 km</b> Average Distance to Nearest Hospital	<b>98.3%</b> Children Completed Immunization Schedule
	<b>Communications Capacity</b>	<b>8.5%</b> Households with Access to Fixed Phone Line	<b>86.7%</b> Households with Access to Mobile Phone	<b>99.4%</b> Households with Access to Electricity		
	<b>Transportation Capacity</b>	<b>47.6km</b> Average Distance to Nearest Port or Airport	<b>17.2km</b> Total Length of Road per 100 km <sup>2</sup> (area)			

<sup>136</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>137</sup> Rank: 18 of 22 Departments (Score: 0.411)**

El Progreso's score and ranking are due to low Vulnerability combined with very high Coping Capacity scores.

Table 105. The 3 thematic areas with the weakest relative scores



**Vulnerable Health Status**



**Environmental Stress**



**Gender Inequality**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>138</sup> Rank: 21 of 22 Departments (Score: 0.360)**

El Progreso's very low Multi-Hazard Risk is a result of very low Multi-Hazard Exposure combined with low Vulnerability and very high Coping Capacity.

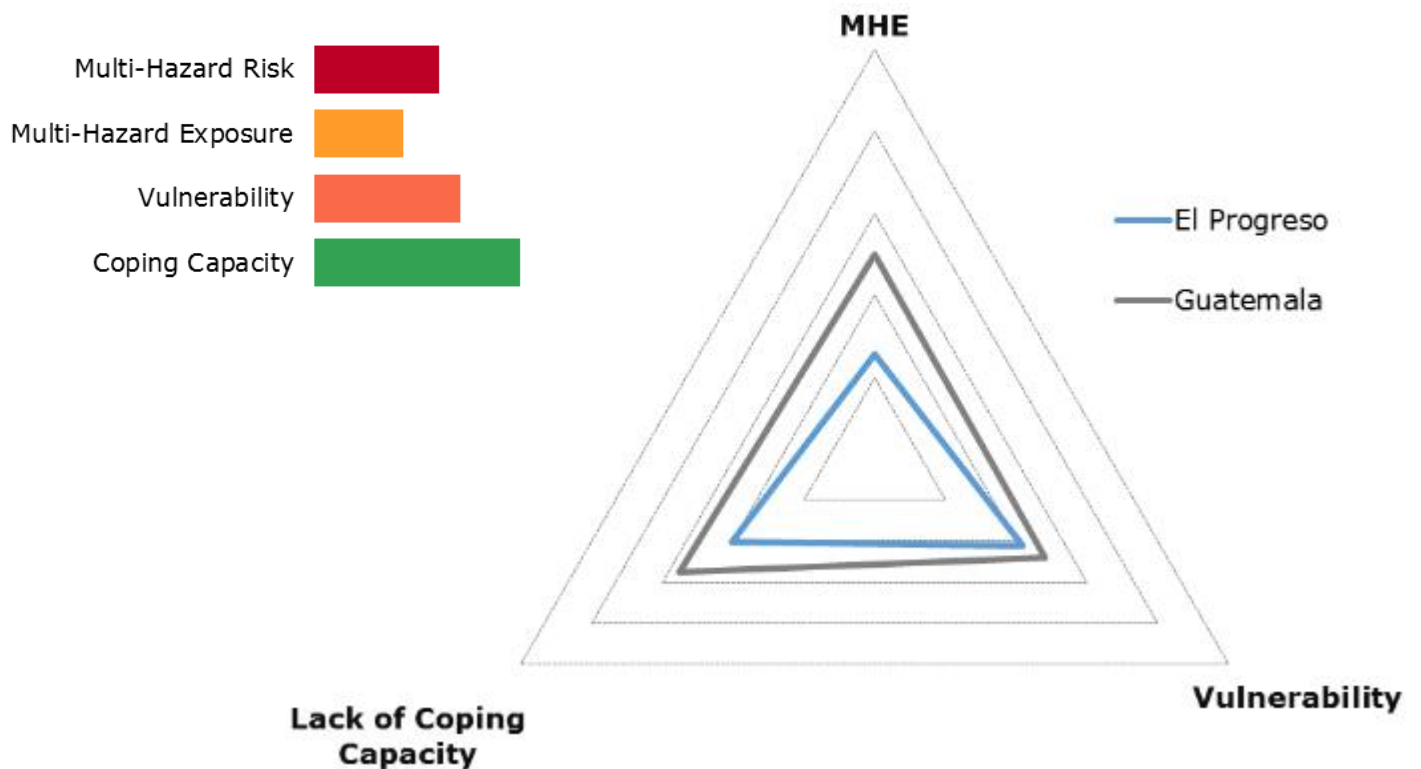


Figure 61. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>137</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country's normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>138</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country's normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Lowest population pressures

Ranked 22 of 22 departments, limited population change allows disaster managers to form accurate evacuation, sheltering, and resource plans.



### High information access

High information access indicates that the population has an increased ability to access and comprehend disaster-related information before, during, and after events.



### High economic capacity

Ranked 2 of 22 departments, high environmental capacity indicates that natural resources and agriculture will be more resilient to the effects of a disaster and may recover faster.

## Recommendations

01

### Provide health education and access

Increased early health education and access for special-needs populations and new/expectant mothers can decrease health vulnerability. Additional health-care infrastructure (doctors and nurses) will increase access to critical services before, during, and after disaster events.

02

### Promote drought-resistant farming methods

A high percentage of the department is at risk of drought. Programs that promote drought-resistant crops and farming methods will decrease vulnerability to drought in the department.

03

### Provide opportunities for women

Public education and awareness programs that focus on increasing the role of women in the workplace and the society will improve resilience and decrease vulnerability.



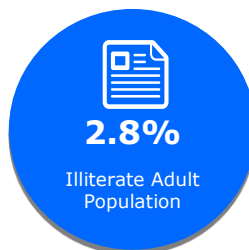
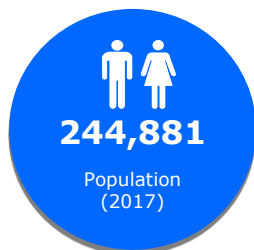
## Department: Zacapa



Department Capital: Zacapa

Area: 2,691 km<sup>2</sup>

Zacapa is in eastern Guatemala and borders Honduras to the southeast. Excluding the highlands, the majority of the department's climate is semi-arid, often going two months without rain. Crops include tomatoes, cantaloupe, tobacco, and sugar cane.



### Municipality Population

Zacapa	77,092
Gualán	42,130
La Unión	34,345
Teculután	19,376
Río Hondo	18,768
Estanzuela	12,444
Usumatlán	12,248
Cabañas	11,635
Huité	10,660
San Diego	6,183



**Multi-Hazard Risk Rank:  
Very Low (22 of 22)**

**Lack of Resilience Rank:  
Very Low (20 of 22)**

## RVA Component Scores

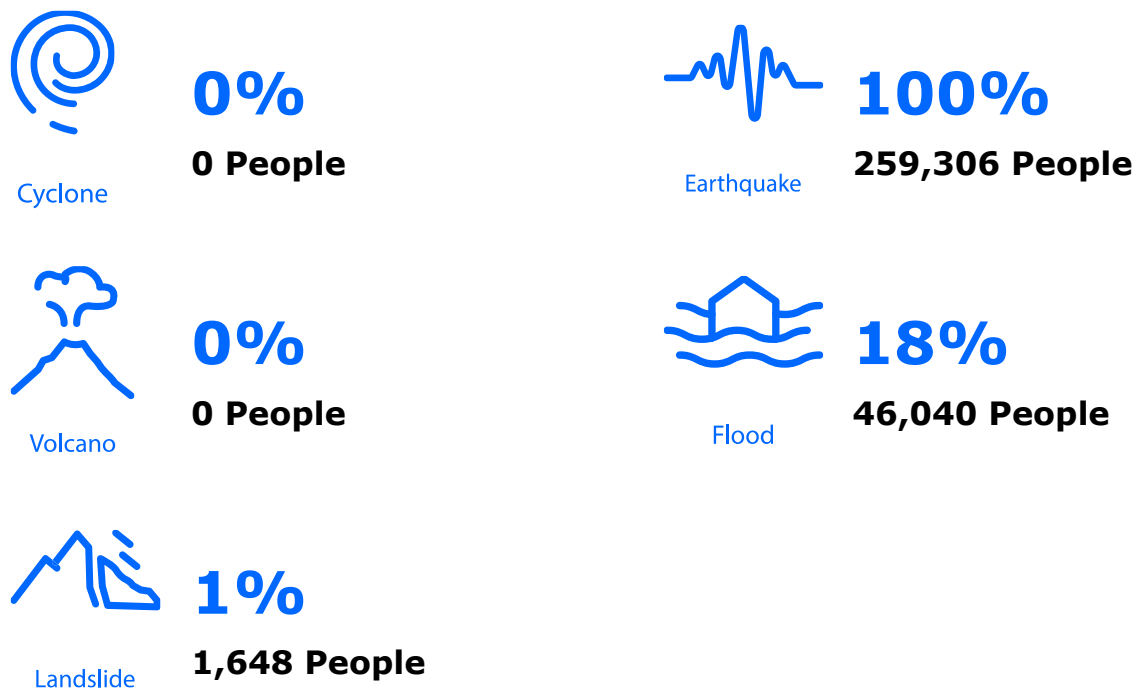
Table 106. Department scores and ranks (compared across departments) for each index

Multi-Hazard Risk		Lack of Resilience		Multi-Hazard Exposure		Vulnerability		Coping Capacity	
Very Low		Very Low		Very Low		Very Low		Very High	
Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)	Score	Rank (of 22)
0.293	22	0.395	20	0.089	21	0.396	20	0.607	3

## Multi-Hazard Exposure (MHE)

Multi-Hazard Exposure<sup>139</sup> Rank: 21 of 22 Departments (Score: 0.089)

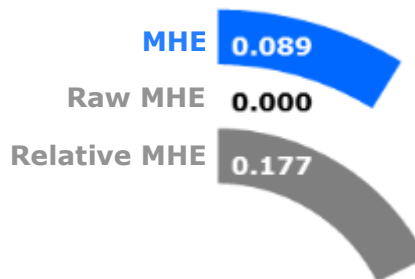
Table 107. Estimated ambient population<sup>140</sup> exposed to each hazard



### The Dry Corridor

Located in Guatemala’s “Dry Corridor,” Zacapa department experiences extreme dry seasons, often going months without rain. The climate is semi-arid and very warm, with highs in excess of 45°C. The Motagua River flows through the center of the department making fertile land for production of sugar cane, tomatoes, and tobacco. Marble and jade is also mined in the area.

<https://www.revolvy.com/topic/Zacapa%20Department>



<sup>139</sup> Multi-Hazard Exposure: Average exposure of the population to hazards.

<sup>140</sup> Ambient Population: 24-hour average estimate of the population in each department. Ambient population typically differs from census population.

## Vulnerability (V)

**Vulnerability<sup>141</sup> Rank: 20 of 22 Departments (Score: 0.396)** Vulnerability in Zacapa is primarily driven by Gender Inequality and Environmental Stress. The bar chart on the right indicates the socioeconomic themes contributing to the department's overall Vulnerability score.

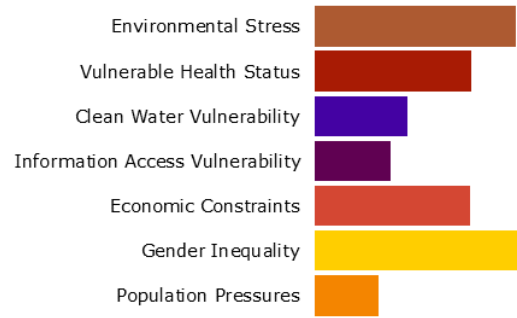









Table 108. Component scores for each Vulnerability sub-component

	<b>Environmental Stress</b>	<b>72.6%</b> Province at Drought Risk	<b>-0.6%</b> Annual Forest Change					
	<b>Vulnerable Health Status</b>	<b>20</b> Infant Mortality Rate	<b>19.7</b> Maternal Mortality Ratio	<b>0.5%</b> Acute Malnutrition	<b>2.72%</b> Population Disabled	<b>13.6</b> TB Incidence	<b>11.8</b> Dengue Prevalence	<b>32.4</b> Malaria Prevalence
	<b>Clean Water Vulnerability</b>	<b>84.9%</b> Households with Access to Improved Water	<b>68.7%</b> Households with Access to Improved Sanitation					
	<b>Information Access Vulnerability</b>	<b>2.8%</b> Adult Illiteracy	<b>5.5</b> Average Years of Schooling	<b>90.5%</b> Primary School Enrollment	<b>8.5%</b> Households with Internet	<b>49.4%</b> Households with Cable TV	<b>73.7%</b> Households with Radio	<b>1.0%</b> Speak Indigenous Language
	<b>Economic Constraints</b>	<b>0.75</b> Economic Dependency Ratio	<b>55.9%</b> Population in Poverty	<b>0.51</b> GINI Coefficient				
	<b>Gender Inequality</b>	<b>0.0%</b> Female Seats in Congress	<b>0.08</b> Ratio of Female to Male Secondary Education Enrollment	<b>0.12</b> Ratio of Female to Male Economic Activity				
	<b>Population Pressures</b>	<b>1.4%</b> Average Annual Population Change	<b>1.5%</b> Average Annual Urban Population Change	<b>40.0%</b> Food Insecurity				

<sup>141</sup> **Vulnerability:** The socioeconomic conditions that are associated with the susceptibility to disruptions in a country's normal functions.

## Coping Capacity (CC)

**Coping Capacity<sup>142</sup> Rank: 3 of 22 Departments (Score: 0.607)** Zacapa displays a very high level of Coping Capacity, which is attributable to very high Environmental and Economic Capacities. The bar chart on the right indicates the socioeconomic themes contributing to the department’s overall Coping Capacity score.

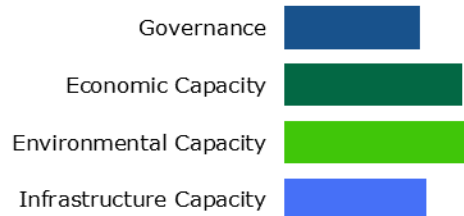


Table 109. Component scores for each Coping Capacity sub-component

	<b>Governance</b>	<b>345.1</b> Crime Victims per 100K	<b>40.8%</b> Households with Garbage Collection				
	<b>Economic Capacity</b>	<b>\$775.3</b> Remittances per Capita (USD)	<b>16.3</b> Businesses per 1,000 persons	<b>15,697</b> GDP per Capita (Quetzales)			
	<b>Environmental Capacity</b>	<b>26.9%</b> Protected Land	<b>4.0%</b> Reforested Area				
	<b>Infrastructure Capacity</b>						
	<b>Health Care Capacity</b>	<b>12.4</b> Hospital Beds per 10,000 Persons	<b>5.5</b> Nurses per 10,000 Persons	<b>6.2</b> Physicians per 10,000 Persons	<b>16.9 km</b> Average Distance to Nearest Hospital	<b>90.8%</b> Children Completed Immunization Schedule	
	<b>Communications Capacity</b>	<b>11.6%</b> Households with Access to Fixed Phone Line	<b>79.0%</b> Households with Access to Mobile Phone	<b>96.9%</b> Households with Access to Electricity			
	<b>Transportation Capacity</b>	<b>21.4 km</b> Average Distance to Nearest Port or Airport	<b>23.5 km</b> Total Length of Road per 100 km <sup>2</sup> (area)				

<sup>142</sup> **Coping Capacity:** The systems, means, and abilities of a country to absorb and respond to events that could potentially disrupt normal function.

## Lack of Resilience (LR)

**Lack of Resilience<sup>143</sup> Rank: 20 of 22 Departments (Score: 0.395)**

Zacapa’s score and ranking are due to very low Vulnerability combined with very high Coping Capacity scores.

Table 110. The 3 thematic areas with the weakest relative scores



**Gender Inequality**



**Environmental Stress**



**Governance**

## Multi-Hazard Risk (MHR)

**Multi-Hazard Risk<sup>144</sup> Rank: 22 of 22 Departments (Score: 0.293)**

Zacapa has the lowest Multi-Hazard Risk in the country, which is attributable to very low Multi-Hazard Exposure combined with very low Vulnerability and very high Coping Capacity scores

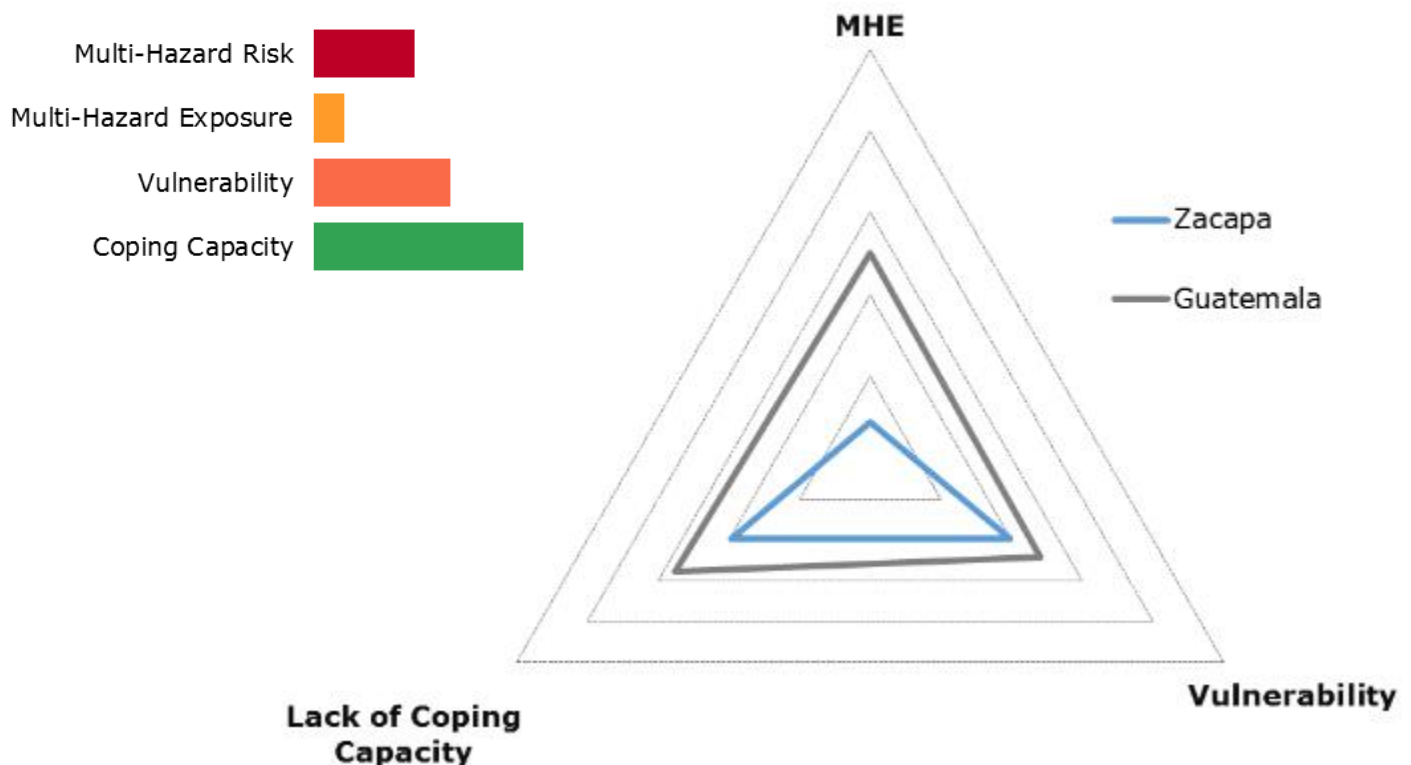


Figure 62. Department Multi-Hazard Risk component scores compared to overall average country scores

<sup>143</sup> **Lack of Resilience:** The susceptibility to impact from the short-term inability to absorb, respond to, and recover from disruptions to a country’s normal function. This index provides a hazard-independent look at current socioeconomic conditions.

<sup>144</sup> **Multi-Hazard Risk:** The likelihood of losses or disruptions to a country’s normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability, and coping capacity.

## Successes



### Lowest overall multi-hazard risk

Ranked 21<sup>st</sup> in Multi-Hazard Exposure, 20<sup>th</sup> in Vulnerability, and 3<sup>rd</sup> in Coping Capacity. Low multi-hazard risk indicates a low susceptibility to impact and the ability to absorb, respond to, and recover from negative impacts that occur over the short term (Coping Capacity).



### High information access

High information access indicates that the population has an increased ability to access and comprehend disaster-related information before, during, and after events.



### Low population pressures

Ranked 20 of 22 departments, limited population change allows disaster managers to form accurate evacuation, sheltering, and resource plans.

## Recommendations

01

### Provide opportunities for women

Offer public education and awareness programs that focus on increasing the role of women in the workplace and the society, which will improve resilience and decrease vulnerability.

02

### Increase environmental programs

Invest in drought-education programs promoting drought-resistant crops and vegetation. Additionally, foster environmental-protection programs to preserve land and vegetation, increasing resiliency and coping capacity.

03

### Increase governance

Invest in government-provided services such as garbage collection, police, and fire. Increased capability in these areas will decrease vulnerability in the department.

**Better solutions.  
Fewer disasters.  
Safer world.**



# Appendices

**National Disaster Preparedness Baseline Assessment  
Final Report**





# Appendix A: RVA Component Index Hierarchies and Thematic Rationale

## Multi-Hazard Exposure

Figure 63. Multi-Hazard Exposure Index Hierarchy

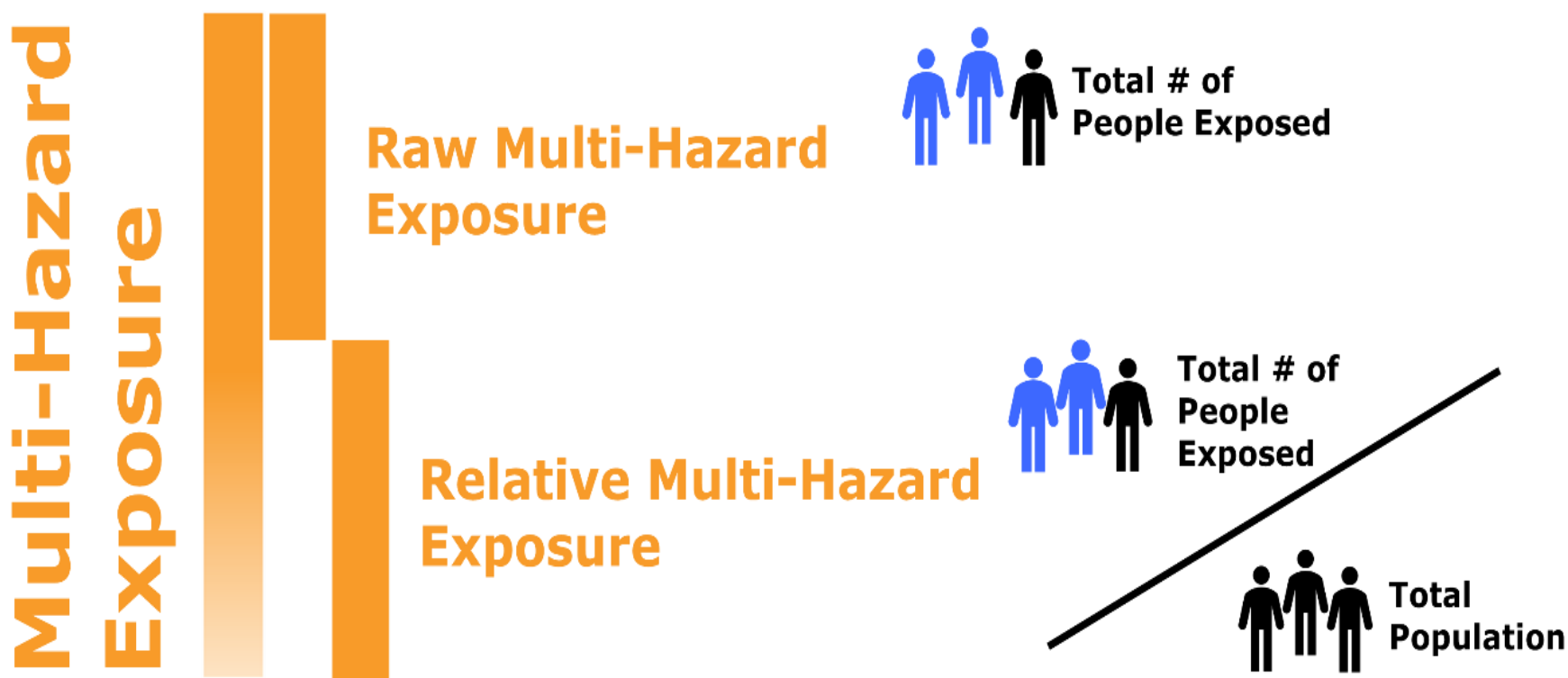


Table 111. Multi-Hazard Exposure scores and ranks for all indices and subcomponents

Department	MHE Index		Raw MHE		Relative MHE	
	Score	Rank	Score	Rank	Score	Rank
<b>Guatemala</b>	0.913	1	1	1	0.825	6
<b>Chimaltenango</b>	0.722	2	0.517	7	0.927	5
<b>Sololá</b>	0.709	3	0.425	11	0.993	2
<b>Quetzaltenango</b>	0.694	4	0.586	3	0.802	8
<b>Totonicapán</b>	0.684	5	0.434	10	0.933	4
<b>Sacatepéquez</b>	0.682	6	0.365	13	1	1
<b>Escuintla</b>	0.674	7	0.543	5	0.805	7
<b>Retalhuleu</b>	0.643	8	0.342	14	0.944	3
<b>Quiché</b>	0.621	9	0.561	4	0.681	10
<b>San Marcos</b>	0.598	10	0.596	2	0.6	12
<b>Suchitepéquez</b>	0.58	11	0.435	9	0.724	9
<b>Huehuetenango</b>	0.471	12	0.54	6	0.403	18
<b>Jutiapa</b>	0.462	13	0.373	12	0.55	15
<b>Santa Rosa</b>	0.425	14	0.296	16	0.553	13
<b>Baja Verapaz</b>	0.413	15	0.218	18	0.607	11
<b>Izabal</b>	0.407	16	0.296	15	0.518	16
<b>Jalapa</b>	0.392	17	0.231	17	0.552	14
<b>Alta Verapaz</b>	0.353	18	0.446	8	0.26	19
<b>El Progreso</b>	0.257	19	0.042	20	0.472	17
<b>Chiquimula</b>	0.22	20	0.18	19	0.26	20
<b>Zacapa</b>	0.089	21	0	22	0.177	21
<b>Petén</b>	0.02	22	0.039	21	0	22

Table 120. RVA – MHE metadata

Multi-Hazard Exposure					
Subcomponent	Indicator	Source(s)	Year	Description	Notes
<b>Raw Exposure</b>	Raw Population Exposure	Landslide Susceptibility data were originally developed by NASA - CATHALAC 2010; Flood data were developed by CONRED TerraHydro 4.2.2 2015; Volcano data were digitized from maps provided by INSUVIMEH and USGS 2001-2005; Seismic Hazard is from CAPRA RESIS-II Project for Latin America 2008; Tropical Cyclone Intensity Zones are from MunichRe and USGS HazPac 2002; Ambient population from ORNL landscan 2014.	2014 (population)	Raw count of person units (based on average ambient population over 24-hour period) exposed to multiple hazards, including floods, landslide, volcanic hazards, earthquake, and tropical cyclone winds.	<p><u>Flood</u>: Areas susceptible to flood were estimated by CONRED using a combination of historical events and geospatial modeling. Susceptibility was classified on a relative scale. All flood areas (low to very high susceptibility) were used to define the hazard zone</p> <p><u>Landslide</u>: Areas susceptible to landslide were estimated by NASA-CATHALAC using environmental factors. Susceptibility was classified on a relative scale. Areas of 'very high', and 'high' susceptibility were used to define the hazard zone.</p> <p><u>Volcanic Hazards</u>: Areas exposed to multiple specific volcanic hazards, including lava flow, pyroclastic flow, debris avalanche, edifice collapse, lahars, ash fall, ballistic bombs for Pacaya, Santiaguito, Cerro Quemado, Fuego, Acatenango, Atitlan, and Agua volcanoes.</p> <p><u>Earthquake</u>: Areas with MMI VII and above based on 1.0 second spectral acceleration at a 2475-year return period.</p> <p><u>Tropical Cyclone Winds</u>: Areas exposed to tropical cyclone wind speeds that coincide with the Saffir-Simpson Scale, Category 1 or higher.</p>

NDPBA Guatemala Report: RVA Component Index Hierarchies and Thematic Rationale

<p><b>Relative Exposure</b></p>	<p>Relative Population Exposure</p>	<p>Landslide Susceptibility data were originally developed by NASA - CATHALAC 2010; Flood data were developed by CONRED TerraHydro 4.2.2 2015; Volcano data were digitized from maps provided by INSUVIMEH and USGS 2001-2005; Seismic Hazard is from CAPRA RESIS-II Project for Latin America 2008; Tropical Cyclone Intensity Zones are from MunichRe and USGS HazPac 2002; Ambient population from ORNL landscan 2014.</p>	<p>2014 (population)</p>	<p>Cumulative raw count of person units exposed to multiple hazards, per capita.</p>	<p>See above</p>
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# Vulnerability

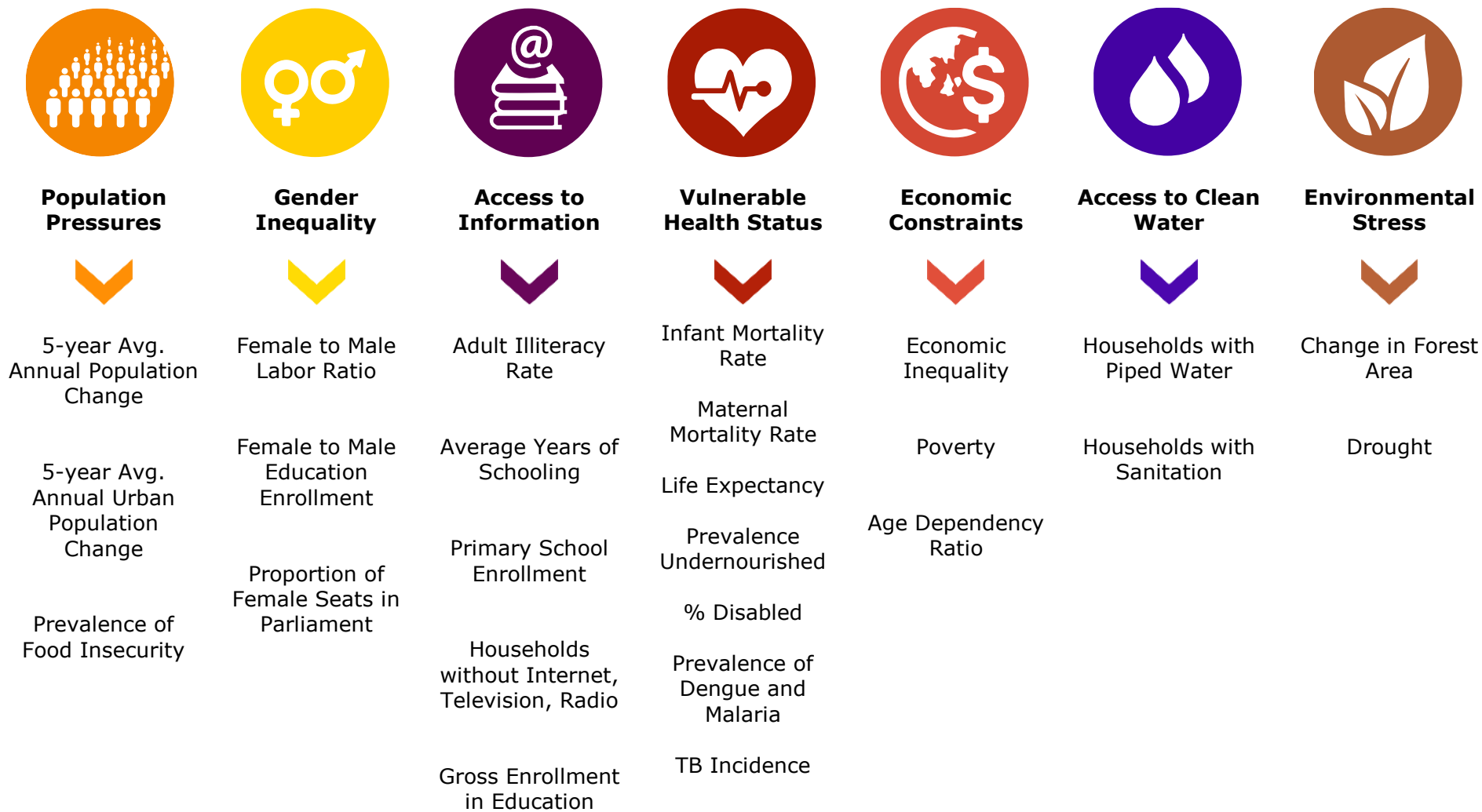


Figure 64. Vulnerability Index hierarchy

Table 112. RVA—Vulnerability scores and ranks for all indices and subcomponents

## NDPBA Guatemala Report: RVA Component Index Hierarchies and Thematic Rationale

Department	Vulnerability Index		Economic Constraints		Info Vuln.	Access	Clean Vuln.	Water	Vuln. Status	Health	Gender Inequality		Population Pressures		Environ. Stress	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
<b>Alta Verapaz</b>	0.707	1	0.728	3	0.864	1	1	1	0.415	16	0.88	1	0.895	1	0.169	20
<b>Totonicapán</b>	0.64	2	0.69	4	0.811	3	0.568	5	0.458	11	0.596	11	0.675	3	0.683	5
<b>Petén</b>	0.612	3	0.568	11	0.553	8	0.708	3	0.413	17	0.731	4	0.86	2	0.451	11
<b>Quiché</b>	0.587	4	0.775	2	0.841	2	0.505	8	0.275	21	0.795	2	0.609	5	0.309	16
<b>Chiquimula</b>	0.579	5	0.551	12	0.571	7	0.504	9	0.573	4	0.659	7	0.387	12	0.806	1
<b>Jalapa</b>	0.572	6	0.789	1	0.485	10	0.448	14	0.429	15	0.764	3	0.474	8	0.617	7
<b>Jutiapa</b>	0.529	7	0.669	6	0.459	13	0.37	17	0.44	14	0.689	5	0.333	15	0.744	2
<b>San Marcos</b>	0.519	8	0.687	5	0.474	11	0.624	4	0.506	7	0.61	9	0.328	16	0.401	13
<b>Baja Verapaz</b>	0.5	9	0.485	15	0.606	6	0.456	12	0.451	13	0.529	13	0.344	14	0.631	6
<b>Sololá</b>	0.488	10	0.578	10	0.743	4	0.376	16	0.272	22	0.412	18	0.619	4	0.415	12
<b>Huehuetenango</b>	0.466	11	0.62	8	0.697	5	0.556	6	0.476	9	0.447	15	0.299	18	0.168	21
<b>Izabal</b>	0.441	12	0.522	13	0.461	12	0.468	11	0.641	3	0.247	22	0.451	9	0.296	17
<b>Chimaltenango</b>	0.441	13	0.629	7	0.551	9	0.401	15	0.342	20	0.386	19	0.39	10	0.388	15
<b>Quetzaltenango</b>	0.44	14	0.593	9	0.387	15	0.337	18	0.479	8	0.646	8	0.243	19	0.396	14
<b>Suchitepéquez</b>	0.434	15	0.493	14	0.39	14	0.475	10	0.554	5	0.526	14	0.501	6	0.103	22
<b>El Progreso</b>	0.421	16	0.306	19	0.23	20	0.336	19	0.668	2	0.569	12	0.141	22	0.695	4
<b>Escuintla</b>	0.412	17	0.25	21	0.352	16	0.509	7	0.681	1	0.423	17	0.496	7	0.174	19
<b>Retalhuleu</b>	0.411	18	0.397	18	0.31	17	0.714	2	0.51	6	0.344	20	0.324	17	0.278	18
<b>Santa Rosa</b>	0.397	19	0.447	17	0.298	18	0.448	13	0.392	18	0.339	21	0.373	13	0.48	10

NDPBA Guatemala Report: RVA Component Index Hierarchies and Thematic Rationale

Department	Vulnerability Index		Economic Constraints		Info Vuln.	Access	Clean Vuln.	Water	Vuln. Status	Health	Gender Inequality		Population Pressures		Environ. Stress	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
<b>Zacapa</b>	0.396	20	0.453	16	0.222	21	0.27	20	0.455	12	0.601	10	0.186	20	0.586	8
<b>Sacatepéquez</b>	0.332	21	0.272	20	0.24	19	0.021	22	0.474	10	0.435	16	0.389	11	0.491	9
<b>Guatemala</b>	0.3	22	0.114	22	0.054	22	0.064	21	0.347	19	0.665	6	0.161	21	0.697	3

Table 113. RVA - Vulnerability metadata

<b>Vulnerability</b>						
<b>Subcomponent</b>	<b>Indicator</b>	<b>Source(s)</b>	<b>Year</b>	<b>Description</b>	<b>Notes</b>	
<b>Economic Constraints</b>	Economic Dependency Ratio	INE MSPAS	2015	The ratio of dependents - (<15 or >64) to the working-age population (15-64) per 100 persons of working age.	Population counts are based on INE projections.	
	Poverty	INE ENCOVI	2014	The proportion of the population living in poverty or extreme poverty.	Poverty and Extreme Poverty Groups are mutually exclusive.	
	Economic Inequality	INE	2014	Economic inequality as measured by the GINI index at the department level.		
<b>Access to Information Vulnerability</b>	Adult Illiteracy Rate	MINED	2015	Percentage of the population aged 15 years and older that is illiterate.		
	Average Years of Schooling	INE ENCOVI	2014	Average years of schooling for the population aged 15 and older.		
	Percent Pop Speaking Indigenous Language	INE ENCOVI	2011	Percent population where primary language is not Spanish.	Languages included are K'iche', Q'eqchi, Kaqchikel, Mam, Q'anjob'al, or other.	
	Primary School Enrollment Rate (Net Enrollment)	MINED	2015	Percentage of children aged 7 to 12 years old that are enrolled in primary education.	Primary school is compulsory in Guatemala.	
	Household Communication Access	Households with Internet	INE ENCOVI	2014	Percentage of households that have internet access.	
		Households with Cable Television	INE ENCOVI	2014	Percentage of households that have cable television.	
		Households with Radio	INE ENCOVI	2009	Percentage of households that have a radio.	
<b>Access to Clean Water Vulnerability</b>	Access to Improved Water Source	INE ENCOVI	2014	Percentage of households with access to improved water.	Improved water includes water piped to the home or ground, and public tap.	
	Access to Improved Sanitation	INE ENCOVI	2014	Percentage of households with access to improved sanitation.	Improved Sanitation includes toilets connected to sewer or septic, and washable toilets.	



## NDPBA Guatemala Report: RVA Component Index Hierarchies and Thematic Rationale

<b>Vulnerability</b>						
<b>Subcomponent</b>	<b>Indicator</b>		<b>Source(s)</b>	<b>Year</b>	<b>Description</b>	<b>Notes</b>
<b>Vulnerable Health Status</b>	Maternal and Child Health	Infant Mortality	MSPAS ENSMI	2014	Single-year infant mortality ratio per 1,000 live births.	
		Maternal Mortality	MSPAS	2014	Maternal mortality ratio per 100,000 live births.	
		Prevalence Undernourished	MSPAS ENSMI	2014	Rate of Acute Malnutrition in children under 5.	Acute Malnutrition is identified when a child's weight is more than 2 SD below the average for their height.
	Population Health Conditions	Percent with Disability	INE	2005	Percent of population with at least one reported disability.	Resulting calculation is potentially overestimation. There was no way to determine if one person reported multiple disabilities.
		Dengue Prevalence	MSPAS	2012 - 2015	Period prevalence of dengue 2012-2015.	Period Prevalence for the years 2009-2015.
		TB Incidence Rate	MSPAS CNE	2014	Newly reported cases of tuberculosis for the year 2014.	Incidence Rate for 2014 (CNE Memory Book).
		Malaria Prevalence	MSPAS	2009 - 2015	Period prevalence of Malaria 2009-2015.	Period Prevalence for 2009-2015.
<b>Environmental Stress</b>	Drought Areas		INSUVIMEH	2014	Percentage of department area within medium, high, and very high drought threat zones.	
	Average Annual Change in Forest Cover		ENCOVI	2006 - 2010	Average annual change in forested area, 2005 - 2010.	
<b>Population Pressures</b>	Prevalence of Food Insecurity		INE Census 2002; INE Population Projections	2002 - 2014	Average annual percentage of total population change for the period of 2002 to 2014.	
	Average Annual Population Change		INE Census 2002; PSPAS/INE - CNE Memory Book 2014	2002 - 2014	Average annual percentage of urban population change for the period of 2002 to 2014.	

## NDPBA Guatemala Report: RVA Component Index Hierarchies and Thematic Rationale

Vulnerability					
Subcomponent	Indicator	Source(s)	Year	Description	Notes
	Average Annual Urban Population Change	INE Census 2002; INE Population Projections	2002 - 2014	Average annual percentage of total population change for the period of 2002 to 2014.	
<b>Gender Inequality</b>	Proportion of Female Seats in Local Government	Congresso (congressional seats); INE Population Projections (Population)	2015	<b>FOR INDEX:</b> Proportion of female congressional district seats by proportion of females in total population. <b>FOR DISPLAY:</b> Percentage of congressional district seats occupied by women.	Values for Guatemala Department include Central District. Many districts have 0 female deputies.
	Ratio of Female to Male Secondary Education Enrollment	MINED	2015	Ratio of female secondary school enrollment rate to male secondary school enrollment rate - combines basic and diversified secondary education for ages 13 to 18.	The age range of 13 to 15 defines Basic Secondary cohort. Ages 16 to 18 define Diversified cohort.
	Female to Male Labor Economic Participation Ratio	Red Nacional del Grupos Gestores	2010	Ratio of female to male economically active population.	Economically active population is defined as all persons of either sex who furnish the supply of labor for the production of economic goods and services.

# Coping Capacity

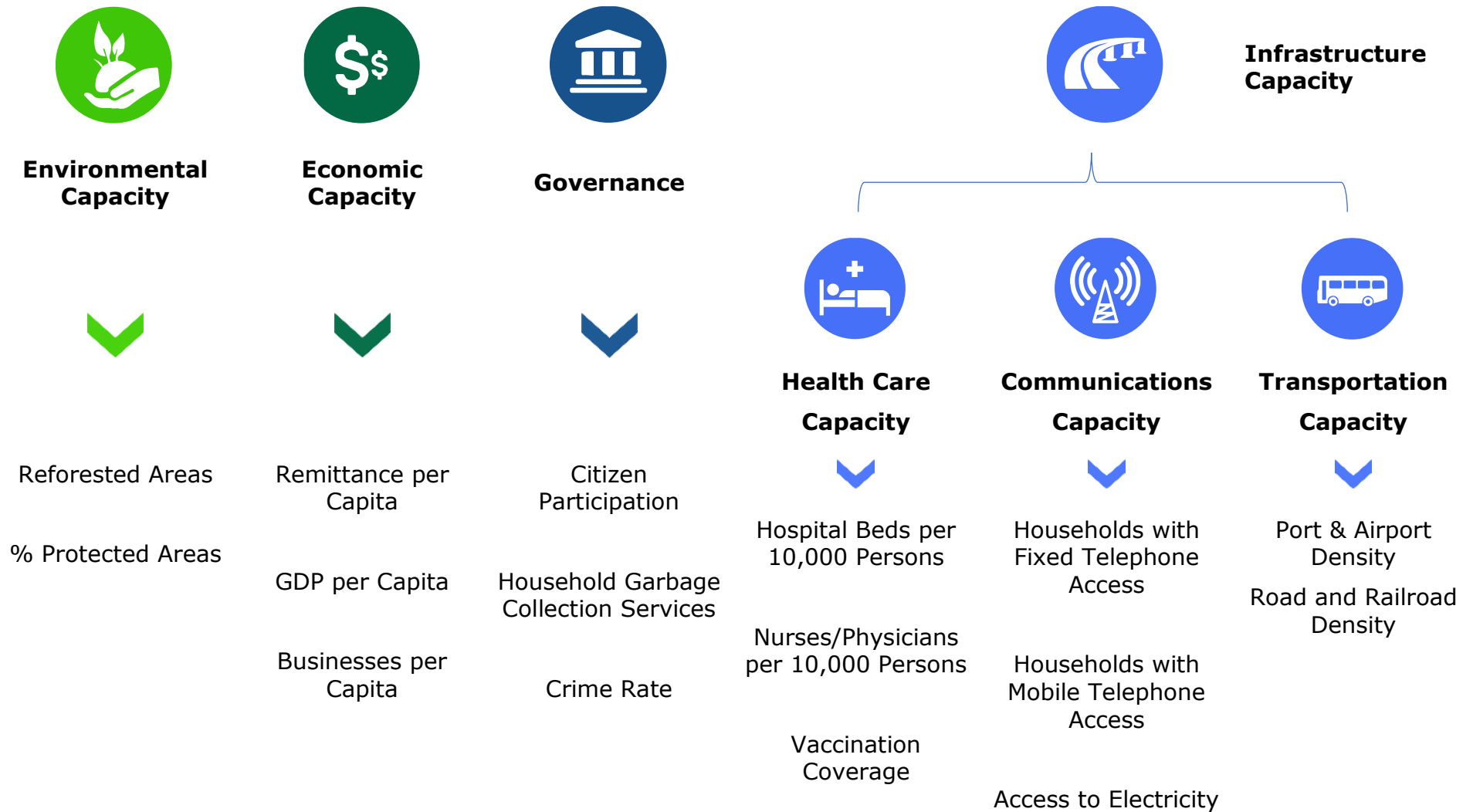


Figure 65. Coping Capacity index hierarchy

# NDPBA Guatemala Report: RVA Component Index Hierarchies and Thematic Rationale

Table 114. RVA - Coping Capacity scores and ranks for all indices and subcomponents

Department	Coping Capacity Index		Governance		Economic Capacity		Environmental Capacity		Infrastructure Index		Health Care (Infra)		Transportation (Infra)		Communication (Infra)	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
<b>Quetzaltenango</b>	0.619	1	0.584	7	0.761	1	0.426	8	0.578	5	0.598	5	0.306	15	0.829	4
<b>Sacatepéquez</b>	0.613	2	0.609	6	0.633	5	0.418	9	0.663	2	0.648	2	0.447	8	0.892	2
<b>Zacapa</b>	0.607	3	0.529	8	0.693	4	0.739	2	0.555	9	0.582	6	0.262	16	0.822	5
<b>El Progreso</b>	0.598	4	0.458	13	0.715	2	0.593	4	0.622	3	0.501	9	0.532	5	0.832	3
<b>Guatemala</b>	0.541	5	0.344	18	0.694	3	0.079	21	0.74	1	0.806	1	0.415	9	1	1
<b>Sololá</b>	0.515	6	0.834	1	0.134	18	1	1	0.416	15	0.312	18	0.455	7	0.482	18
<b>Baja Verapaz</b>	0.507	7	0.647	2	0.437	11	0.604	3	0.403	16	0.34	15	0.483	6	0.386	20
<b>Chiquimula</b>	0.457	8	0.488	11	0.532	8	0.307	12	0.403	17	0.428	11	0.251	17	0.53	17
<b>Jutiapa</b>	0.453	9	0.48	12	0.436	12	0.091	20	0.563	8	0.378	13	0.668	2	0.641	10
<b>Izabal</b>	0.439	10	0.446	14	0.535	7	0.512	7	0.313	19	0.26	20	0.103	22	0.576	14
<b>Totonicapán</b>	0.438	11	0.636	4	0.116	21	0.555	5	0.522	11	0.384	12	0.552	4	0.629	11
<b>Retalhuleu</b>	0.418	12	0.252	20	0.623	6	0.123	18	0.477	14	0.532	8	0.204	19	0.693	8
<b>Santa Rosa</b>	0.414	13	0.359	17	0.411	13	0.123	17	0.568	7	0.635	3	0.384	11	0.684	9
<b>Chimaltenango</b>	0.405	14	0.437	15	0.22	17	0.358	10	0.573	6	0.321	17	0.685	1	0.712	7
<b>Suchitepéquez</b>	0.397	15	0.323	19	0.462	9	0.169	15	0.483	13	0.551	7	0.346	14	0.553	16
<b>Escuintla</b>	0.397	16	0.25	21	0.451	10	0.095	19	0.59	4	0.61	4	0.406	10	0.754	6
<b>Jalapa</b>	0.396	17	0.388	16	0.385	14	0.033	22	0.537	10	0.372	14	0.641	3	0.596	13
<b>San Marcos</b>	0.389	18	0.503	9	0.223	16	0.264	13	0.484	12	0.448	10	0.381	12	0.622	12

## NDPBA Guatemala Report: RVA Component Index Hierarchies and Thematic Rationale

Department	Coping Capacity Index		Governance		Economic Capacity		Environmental Capacity		Infrastructure Index		Health Care (Infra)		Transportation (Infra)		Communication (Infra)	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
<b>Huehuetenango</b>	0.316	19	0.492	10	0.117	20	0.133	16	0.399	18	0.246	22	0.38	13	0.571	15
<b>Quiché</b>	0.311	20	0.613	5	0.05	22	0.242	14	0.295	20	0.339	16	0.107	21	0.438	19
<b>Alta Verapaz</b>	0.311	21	0.645	3	0.129	19	0.314	11	0.158	22	0.298	19	0.148	20	0.028	22
<b>Petén</b>	0.306	22	0.238	22	0.355	15	0.532	6	0.251	21	0.259	21	0.23	18	0.265	21

Table 115. RVA - Coping Capacity metadata

Coping Capacity Subcomponent	Indicator		Source(s)	Year	Description	Notes
<b>Environmental Capacity</b>	Reforestation Areas		INAB	2014	Percentage of land area that is currently managed under the PINFOR or PINPEP reforestation projects.	Included PINFOR and PINPEP management of natural forest and agro-forest.
	Protected Area		SIGAP	2015	Percentage of department area that is within a natural protected area.	
<b>Infrastructure – Healthcare –</b>	Average Distance to Hospital		CONRED	2010	Average distance to nearest hospital.	
	Doctors per 1,000 Persons		IGSS/MSPAS	2102	Total number of IGSS and MSPAS Doctors divided by population per 1000 persons.	
	Hospital Beds per 1,000 Persons		IGSS/MSPAS	2102	Total IGSS and MSPAS Hospital Beds Per 1000 persons.	
	Nurses per 1,000 Persons		IGSS/MSPAS	2012	Total number of IGSS and MSPAS Nurses divided by population per 1000 persons.	
	Immunization Coverage	DPT Vaccination Coverage	MSPAS	2012	Percentage of Children aged 6 - 59 months that have received 3 or more doses of DPT vaccine.	
		OPV Vaccination Coverage (Polio)	MSPAS	2012	Percentage of children aged 6 - 59 months that have received 3 or more doses of OPV (polio) vaccine.	
		BCG Vaccination Coverage (TB)	MSPAS	2012	Percentage of children aged 6 - 59 months that have received BCG (TB) vaccine.	
		Measles Vaccination Coverage	MSPAS	2012	Percentage of Children aged 12 - 59 months that have received measles vaccine.	
	<b>Infrastructure - Transportation</b>	Road Density		DGC Guatemala	2014	Total length of road (km) per 100 sq. km of land.
Distance to Port or Airport		UN-ICAO/Ourairports/PDC	2017	Average distance to nearest port or airport.	A list of airports was generated by combining	

## NDPBA Guatemala Report: RVA Component Index Hierarchies and Thematic Rationale

Coping Capacity Subcomponent	Indicator	Source(s)	Year	Description	Notes
		(airports); NGA Global (seaports)			ICAO airports with an open-source geolocated airports list for Guatemala gathered from Ourairports. Airport locations were visually verified by PDC. Locations that could not be verified were not included in the final dataset.
<b>Infrastructure - Communications</b>	Fixed Phone Access	INE ENCOVI	2014	Percentage of households that have a fixed phone line.	
	Access to Electricity	Ministerio de Energia y Minas	2013	Percentage of households that have electricity.	
	Mobile Phone Access	INE ENCOVI	2014	Percentage of households that have a mobile cellular telephone.	
<b>Economic Capacity</b>	GDP (Producto Interno Bruto) per Capita	Red Nacional del Grupos Gestores	2010	Gross Domestic Product per Person.	
	Remittances Per Capita	OIM	2015	Remittances in USD per person.	Values obtained from the <i>Encuesta sobre migracion internacional de personas Guatemaltecas y Remasas 2016</i>
	Businesses per capita	Red Nacional del Grupos Gestores	2010	Number of businesses per 1,000 persons.	
<b>Governance</b>	Population Participation	SEGEPLAN	2013	Citizen Participation Index	Composite index of seven Indicators measuring citizen participation at the municipal level.
	Households Receiving Public Garbage Collection	INE ENCOVI	2014	Percentage of households that receive public municipal garbage collection services.	
	Crime Rate	Policia Nacional Civil (Crime Data); INE (Population Projections)	2014	Rate of crime victimization per 100,000 persons.	

## Appendix B: RVA Index Construction

After finalizing the datasets for the analysis, indicators were created. Indicators are simply standardized datasets representing one aspect of multi-hazard risk that can be combined in a meaningful way. The indicators used to create subcomponent indices represent a wide range of concepts and are often measured using inconsistent units, ranges, and scales. To make meaningful comparisons between concepts, and to combine them and perform the mathematical operations required to create a single composite-index score, indicator values were normalized. Normalization produces a consistent value range and direction across all indicators.

However, as data skewness and outliers may heavily influence the distribution of observations along a normalized scale, some transformations were made prior to rescaling. Minimums, maximums, standard deviations, means, and skew were calculated for each dataset. Datasets showing substantial skewness (beyond +/-1) were evaluated on a case by case basis and transformed using common statistical methods (e.g., natural log, square root, or cube root). In addition to controlling for skewness, indicators were evaluated to ensure consistent conceptual direction between the data and the overall concept modeled in the subcomponent and component index. For example, an indicator of households' access to internet is included within the Information Access Vulnerability subcomponent in the Vulnerability Index. However, *increases* in household internet access conceptually *decrease* vulnerability. To match the direction of the indicator with its effect on overall vulnerability, the data are transformed using the reflection equation:

$$(\text{Indicator maximum value} + 1) - \text{Observed indicator value}$$

Following these transformations, indicators were normalized to create scaled scores ranging from 0 to 1, with the following equation:

$$\frac{(\text{Observed indicator value} - \text{Indicator minimum value})}{(\text{Indicator maximum value} - \text{Indicator minimum value})}$$

In cases where an indicator-observed value was outside +/- 3 standard deviations from the mean, these were excluded from the scaling equation (e.g., 'indicator minimum value' and 'indicator maximum value' in the above equation). Instead the value closest to 3 standard deviations of the mean (without exceeding) was substituted, replacing the minimum or maximum value.

This approach to establishing minimum and maximum values conceptually anchors the range, indicating relative position between the 'worst realistic case' and the 'best realistic case' for each indicator in the country. Subcomponent scores represent the unweighted average of indicators. Likewise, component Indices (MHE, V, and C) represent the average of their respective subcomponent scores. This method maintains a consistent scale and range through the index construction hierarchy, with a minimum value of 0 and a maximum value of 1.



It is important to note that '0' does not represent 'No Risk,' (or Hazard Exposure or Coping Capacity or Vulnerability), but instead indicates the minimum realistic case relative to the data analyzed for the country. The resulting indices are mapped using a quantile classification to illustrate the relative distribution of each overall concept throughout Guatemala.

# Appendix C: CDM Survey I

## Introduction

As part of CDM data gathering efforts, stakeholder participants completed an initial survey during the NDPBA Kickoff Meeting/Initial Knowledge Exchange in Guatemala City, Guatemala, on 12 May 2016. Survey questions were designed to provide insight into how participants perceive CDM efforts within their country. Survey I included a total of 24 questions, four of which required short answer responses. Frequency tables of responses to survey questions 1-20 are included for reference.

*Table 116. Organizational affiliation of survey respondents (CDM Survey I)*

<b>Organizational Affiliation of Survey Respondents</b>	<b>Number</b>	<b>Percent (%)</b>
Central Government	<b>29</b>	<b>50%</b>
Local Government	<b>9</b>	<b>16%</b>
INGOs	<b>7</b>	<b>12%</b>
UN	<b>1</b>	<b>2%</b>
Universities	<b>2</b>	<b>3%</b>
Other	<b>1</b>	<b>2%</b>
Not stated	<b>9</b>	<b>15%</b>

*Table 117. Age of survey respondents (CDM Survey I)*

<b>Age of Survey Respondents (years)</b>	<b>Number</b>	<b>Percent (%)</b>
<b>18-25</b>	1	2%
<b>26-30</b>	5	9%
<b>31-40</b>	24	41%
<b>41-50</b>	11	19%
<b>51-60</b>	9	15%
<b>61-65</b>	1	2%
<b>Over 65</b>	2	3%
<b>Not stated</b>	5	9%

*Table 118. Gender of survey respondents (CDM Survey I)*

<b>Gender of Survey Respondents</b>	<b>Number</b>	<b>Percent (%)</b>
<b>Female</b>	13	22%
<b>Male</b>	42	73%
<b>Not stated</b>	3	5%

Survey responses were validated through interviews conducted over the course of the project. Interview subjects represented national and subnational government organizations and NGOs, and included leaders and specialists in the field of disaster management.

## Frequency Tables of CDM Survey I Responses

Table 119. Survey I response - Question 1

<b>Are you in a position of leadership within your organization?</b>		
	Frequency	Percent
<b>Yes</b>	39	67.2
<b>No</b>	16	27.6
<b>I don't know</b>	2	3.4
<b>Does not apply</b>	0	0
<b>Missing</b>	1	1.7
<b>Total</b>	58	100

Table 120. Survey I response - Question 2

<b>Do you feel you have the necessary resources to effectively perform your job requirements?</b>		
	Frequency	Percent
<b>Yes</b>	30	51.7
<b>No</b>	25	43.1
<b>I don't know</b>	0	0
<b>Does not apply</b>	3	5.2
<b>Missing</b>	0	0
<b>Total</b>	58	100

Table 121. Survey I response - Question 3

<b>In your current position, have you been provided with opportunities for disaster management training?</b>		
	Frequency	Percent
<b>Yes</b>	39	67.2
<b>No</b>	17	29.3
<b>I don't know</b>	0	0
<b>Does not apply</b>	0	0
<b>Missing</b>	2	3.4
<b>Total</b>	58	100

Table 122. Survey I response - Question 4

<b>Does your organization require you to complete training on disaster management?</b>		
	Frequency	Percent
<b>Yes</b>	35	60.3
<b>No</b>	11	19.0
<b>I don't know</b>	6	10.3
<b>Does not apply</b>	3	5.2
<b>Missing</b>	3	5.2
<b>Total</b>	58	100

Table 123. Survey I response - Question 5

<b>Has disaster management training improved your ability to effectively perform your job duties/requirements?</b>		
	Frequency	Percent
<b>Yes</b>	47	81.0
<b>No</b>	4	6.9
<b>I don't know</b>	2	3.4
<b>Does not apply</b>	5	8.6
<b>Missing</b>	0	0
<b>Total</b>	58	100

Table 125. Survey I response - Question 7

<b>Does your organization have a dedicated budget for disaster preparedness?</b>		
	Frequency	Percent
<b>Yes</b>	28	48.3
<b>No</b>	23	39.7
<b>I don't know</b>	5	8.6
<b>Does not apply</b>	0	0
<b>Missing</b>	2	3.4
<b>Total</b>	58	100

Table 124. Survey I response - Question 6

<b>Have you experienced any barriers to attending disaster management training?</b>		
	Frequency	Percent
<b>Yes</b>	22	37.9
<b>No</b>	29	50.0
<b>I don't know</b>	0	0
<b>Does not apply</b>	5	8.6
<b>Missing</b>	2	3.4
<b>Total</b>	58	100

Table 126. Survey I response - Question 8

<b>Does your organization have a dedicated budget for disaster response?</b>		
	Frequency	Percent
<b>Yes</b>	21	36.2
<b>No</b>	28	48.3
<b>I don't know</b>	5	8.6
<b>Does not apply</b>	1	1.7
<b>Missing</b>	3	5.2
<b>Total</b>	58	100

Table 127. Survey I response - Question 9

<b>Does your organization have mutual-aid agreements in place?</b>		
	Frequency	Percent
<b>Yes</b>	26	44.8
<b>No</b>	12	20.7
<b>I don't know</b>	13	22.4
<b>Does not apply</b>	3	5.2
<b>Missing</b>	4	6.9
<b>Total</b>	58	100

Table 128. Survey I response - Question 10

<b>In your opinion, does your organization have sufficient inventory to respond to a large-scale disaster?</b>		
	Frequency	Percent
<b>Yes</b>	6	10.3
<b>No</b>	41	70.7
<b>I don't know</b>	5	8.6
<b>Does not apply</b>	3	5.2
<b>Missing</b>	3	5.2
<b>Total</b>	58	100

Table 129. Survey I response - Question 11

<b>Do you feel that existing disaster risk reduction laws are being adequately implemented at the national level?</b>		
	Frequency	Percent
<b>Yes</b>	6	10.3
<b>No</b>	38	65.5
<b>I don't know</b>	10	17.2
<b>Does not apply</b>	3	5.2
<b>Missing</b>	1	1.7
<b>Total</b>	58	100

Table 130. Survey I response - Question 12

<b>Do you feel that existing disaster risk reduction laws are being adequately implemented at the subnational level?</b>		
	Frequency	Percent
<b>Yes</b>	5	8.6
<b>No</b>	41	70.7
<b>I don't know</b>	9	15.5
<b>Does not apply</b>	2	3.4
<b>Missing</b>	1	1.7
<b>Total</b>	58	100

Table 131. Survey I response - Question 13

<b>In your opinion, do Departments actively support disaster management?</b>		
	Frequency	Percent
<b>Yes</b>	17	29.3
<b>No</b>	28	48.3
<b>I don't know</b>	10	17.2
<b>Does not apply</b>	1	1.7
<b>Missing</b>	2	3.4
<b>Total</b>	58	100

Table 133. Survey I response - Question 15

<b>In your opinion, do Departments currently have the capacity to effectively respond to local disasters?</b>		
	Frequency	Percent
<b>Yes</b>	5	8.6
<b>No</b>	48	82.8
<b>I don't know</b>	2	3.4
<b>Does not apply</b>	1	1.7
<b>Missing</b>	2	3.4
<b>Total</b>	58	100

Table 132. Survey I response - Question 14

<b>In your opinion, is there adequate local support for disaster risk reduction?</b>		
	Frequency	Percent
<b>Yes</b>	9	15.5
<b>No</b>	40	69.0
<b>I don't know</b>	7	12.1
<b>Does not apply</b>	1	1.7
<b>Missing</b>	1	1.7
<b>Total</b>	58	100

Table 134. Survey I response - Question 16

<b>In your opinion, is there strong support of public-private partnerships in disaster management at the local level?</b>		
	Frequency	Percent
<b>Yes</b>	20	34.5
<b>No</b>	28	48.3
<b>I don't know</b>	9	15.5
<b>Does not apply</b>	0	0
<b>Missing</b>	1	1.7
<b>Total</b>	58	100

Table 135. Survey I response - Question 17

<b>In your opinion, are non-government organizations (NGOs) actively engaged in disaster preparedness at the local level?</b>		
	Frequency	Percent
<b>Yes</b>	28	48.3
<b>No</b>	19	32.8
<b>I don't know</b>	10	17.2
<b>Does not apply</b>	0	0
<b>Missing</b>	1	1.7
<b>Total</b>	58	100

Table 136. Survey I response - Question 18

<b>In your opinion, is the national disaster management budget adequate to respond to a major disaster?</b>		
	Frequency	Percent
<b>Yes</b>	18	39.1
<b>No</b>	19	41.3
<b>I don't know</b>	9	19.6
<b>Does not apply</b>	0	0
<b>Missing</b>	0	0
<b>Total</b>	46	100

Table 137. Survey I response - Question 19

<b>In your opinion, is there sufficient government inventory (supplies) to respond to a large-scale disaster?</b>		
	Frequency	Percent
<b>Yes</b>	2	3.4
<b>No</b>	51	87.9
<b>I don't know</b>	4	6.9
<b>Does not apply</b>	0	0
<b>Missing</b>	1	1.7
<b>Total</b>	58	100

Table 138. Survey I response - Question 20

<b>In your opinion, are non-government organizations (NGOs) effectively supporting national disaster management goals?</b>		
	Frequency	Percent
<b>Yes</b>	15	25.9
<b>No</b>	26	44.8
<b>I don't know</b>	16	27.6
<b>Does not apply</b>	0	0
<b>Missing</b>	1	1.7
<b>Total</b>	58	100

## Participant Definitions of 'Comprehensive Disaster Management'

<b>Respondent</b>	<b>Definition</b>
<b>1</b>	Regular
<b>2</b>	Etymologically speaking it is a method of processes that helps to prevent material damages to the citizens of our country, to manage and provide a better environment and quality of life to our inhabitants
<b>3</b>	It is managed but the participation is far from the events
<b>4</b>	It is the way used to get to know the economic and social impact that a natural or social event can have if we do not work on risk research programs
<b>5</b>	Defined as the actions to carry out measures to reduce human and material losses
<b>6</b>	They are the policies and strategies aimed at reducing the impact of disasters through the empowerment of communities, territorial ordering, prevention, readiness, mitigation, etc.
<b>7</b>	The capacity of a society to adequately manage the response to the impact of an adverse event, reducing the generation of new risk scenarios and contributing to an early recovery
<b>8</b>	Management of all solutions and variables related to pre-and post-events
<b>9</b>	Methodology by which persons and institutions work to mitigate disasters and in the worst of cases, work so that the affected area may have an effective resilience
<b>10</b>	Strengthening of development priorities for the reduction of risks in the event of disasters
<b>11</b>	Regular
<b>12</b>	Full execution before, during and after a disaster
<b>13</b>	Organization, timely distribution of care, damage mitigation, in face of a disaster



<b>Respondent</b>	<b>Definition</b>
<b>14</b>	It is the capacity of an institution to identify and mitigate the risks that it is exposed to
<b>15</b>	It is the set of methods, processes, actions that lead to the resolution of disasters and to risk reduction
<b>16</b>	The effort and creation of methodologies to prevent, and take care of disasters
<b>17</b>	I can define "disaster comprehensive management" as the action method that allows providing support to disasters in a defined territory
<b>18</b>	They are a series of activities that allow society to determine their threats and vulnerabilities in each sector and propose solution or mitigation measures for the areas of greatest risk
<b>19</b>	Analysis of risk components, assessment of vulnerability and resilience conditions of the communities and their production systems, on environmental, social, economic and cultural issues
<b>20</b>	Take all the factors that could represent a risk to confront it and respond to it in the most adequate manner possible
<b>21</b>	Actions leading to a greater care in an emergency are the best. Although in Guatemala we work in a comprehensive risk management geared towards disaster prevention, as a probability of the occurrence of an event
<b>22</b>	The terminology of a disaster cannot be managed, we get to know, assess and communicate disasters by means of processes
<b>23</b>	How to support people to avoid irreparable losses
<b>24</b>	The process by which the actions leading to vulnerability are identified, regarding the development processes of each country
<b>25</b>	It is the readiness, knowledge, resources and will to face a disaster
<b>26</b>	Manage the territory, population, in issues of vulnerability and the capability of persons to respond together with the institution
<b>27</b>	Sustainable development process, linked to the use of capabilities to analyze risks and the strategies to collaborate with others allowing to save lives, reduce material losses, and environmental damages

<b>Respondent</b>	<b>Definition</b>
<b>28</b>	The way to reduce vulnerability in the communities
<b>29</b>	It is how to manage and care for all internal and external factors that affect or are affected by a disaster
<b>30</b>	Joint work of all institutions in charge of risks as well as those that can provide support in a case of an event and that are committed to seeking support from international institutions
<b>31</b>	Consists in a risk and analysis research and the exchange of information in accordance with the assessment of natural risk aspects
<b>32</b>	No definition provided
<b>33</b>	As in a diagnostic process or procedure for disaster preparedness (preventive not corrective)
<b>34</b>	Management of a potential risk or disaster
<b>35</b>	Take into consideration all aspects involved in the analysis and management of potential disasters in the country
<b>36</b>	Provide, facilitate, serve as an inter-agency liaison, comprehensive management. Everything regarding the plans and protocols on disaster issues as the case may be
<b>37</b>	A technical resource for grouping or integrating. To face any emergency situation occurring in the country
<b>38</b>	The processes carried out to prevent or reduce risks of disasters, taking into account all the stakeholders that participate in the various phases of a disaster
<b>39</b>	When an institution fulfills its mandate to do things well and in accordance with the territorial ordering standard, use of soil, construction codes, etc.
<b>40</b>	No definition provided
<b>41</b>	Comprehensive risk management is not preparedness to respond.
<b>42</b>	Comprehensive risk management is different from disaster management

<b>Respondent</b>	<b>Definition</b>
<b>43</b>	All the actions developed jointly to reduce or eliminate the risk to disasters. This through the knowledge of the threat, vulnerability and boosting our capabilities
<b>44</b>	Drafting of risk mechanisms during, and after the event, including all technical, social and economic sectors. Etc. For the resilience of communities or countries
<b>45</b>	Very good, but must move from theory to practice
<b>46</b>	It is something developed in three dimensions to avoid the existence of risks
<b>47</b>	Covers all the necessary parameters to be executed in the case of an unforeseen event that may affect a community or particular group
<b>48</b>	Efforts focused on risk prevention that endangers human lives from certain vulnerabilities
<b>49</b>	Seeks to respond in a comprehensive manner to any event taking into account the information of all possible stakeholders
<b>50</b>	The comprehensive management of risks and vulnerabilities in an adequate technical manner during an emergency by ordering stakeholders, assistance and available resources
<b>51</b>	It is the interaction of several institutions in disaster prevention and response
<b>52</b>	Compilation of knowledge and methods to be employed in the reduction or confrontation of a disaster
<b>53</b>	It is in charge of seeing that the population is informed about the processes and procedures to determine the risk
<b>54</b>	Strengthening of priorities to develop the reduction of risks to disasters
<b>55</b>	Set of options to prevent and/or reduce the impact of a disaster
<b>56</b>	It is the planning of control and response measures in face of a disaster where all related stakeholders are involved
<b>57</b>	An organized manner to prepare for a disaster in the country, with knowledge and specialized experience. An important branch to put into practice in all institutions to be ready for a disaster

<b>Respondent</b>	<b>Definition</b>
<b>58</b>	Understand the risk and strengthening of governance systems for risk management. Invest in risk reduction and resilience building. Improve the preparation for an effective response. Rehabilitate and reconstruct
<b>59</b>	Prevent people living in constructions located in risk areas and motivate them to reforest the area at the same time to improve the environment

## Appendix D: CDM Survey II

### Introduction

As part of CDM data gathering efforts, stakeholder participants completed a second survey during the NDPBA Knowledge Exchange II in Guatemala City, Guatemala, on 07 February 2017. Survey II was designed to assess the presence of comprehensive disaster management plans, specific components of disaster management plans, and the drilling and exercising of plans within organizations at both the national and subnational level. Survey II included a total of 34 questions, five of which required short answer responses. Frequency tables of responses to survey questions 1-29 are included for reference.

*Table 139. Organizational affiliation of survey respondents (CDM Survey II)*

<b>Organizational Affiliation of Survey Respondents</b>	<b>Number</b>	<b>Percent (%)</b>
<b>Central Government</b>	51	54%
<b>Local Government</b>	13	14%
<b>NGOs</b>	6	6%
<b>UN</b>	1	1%
<b>Universities</b>	4	4%
<b>Not stated</b>	4	4%

*Table 140. Age of survey respondents (CDM Survey II)*

<b>Age of Survey Respondents (years)</b>	<b>Number</b>	<b>Percent (%)</b>
<b>18-25</b>	6	6%
<b>26-30</b>	9	9%
<b>31-40</b>	31	33%
<b>41-50</b>	23	25%
<b>51-60</b>	9	9%
<b>61-65</b>	0	0%
<b>Over 65</b>	1	1%
<b>Not stated</b>	16	17%

*Table 141. Gender of survey respondents (CDM Survey II)*

<b>Gender of Survey Respondents</b>	<b>Number</b>	<b>Percent (%)</b>
<b>Female</b>	31	33%
<b>Male</b>	49	51%
<b>Not stated</b>	15	16%

Survey responses were validated during interviews conducted by PDC staff over the course of the project. Interview subjects represented national and subnational government organizations and NGOs, and included leaders and specialists in disaster management.

# Frequency Tables of CDM Survey II Responses

Table 142. Survey II response - Question 1

<b>Does your organization have a comprehensive disaster management plan?</b>		
	Frequency	Percent
<b>Yes</b>	74	77.9
<b>No</b>	18	18.9
<b>I don't know</b>	1	1.1
<b>Does not apply</b>	2	2.1
<b>Missing</b>	0	0
<b>Total</b>	95	100

Table 143. Survey II response - Question 2

<b>Does your organization have a disaster response plan?</b>		
	Frequency	Percent
<b>Yes</b>	80	84.2
<b>No</b>	13	13.7
<b>I don't know</b>	0	0
<b>Does not apply</b>	2	2.1
<b>Missing</b>	0	0
<b>Total</b>	95	100

Table 144. Survey II response - Question 3

<b>Does your organization have a disaster preparedness plan?</b>		
	Frequency	Percent
<b>Yes</b>	71	74.7
<b>No</b>	19	20.0
<b>I don't know</b>	3	3.2
<b>Does not apply</b>	2	2.1
<b>Missing</b>	0	0
<b>Total</b>	95	100

Table 145. Survey II response - Question 4

<b>Does your organization have a disaster mitigation plan?</b>		
	Frequency	Percent
<b>Yes</b>	55	57.9
<b>No</b>	31	32.6
<b>I don't know</b>	5	5.3
<b>Does not apply</b>	3	3.2
<b>Missing</b>	1	1.1
<b>Total</b>	55	57.9

Table 146. Survey II response - Question 5

<b>Does your organization have a recovery plan?</b>		
	Frequency	Percent
<b>Yes</b>	49	51.6
<b>No</b>	32	33.7
<b>I don't know</b>	9	9.5
<b>Does not apply</b>	3	3.2
<b>Missing</b>	2	2.1
<b>Total</b>	95	100

Table 148. Survey II response - Question 7

<b>Do you have a copy of the disaster management plan(s)?</b>		
	Frequency	Percent
<b>Yes</b>	57	60.0
<b>No</b>	36	37.9
<b>I don't know</b>	0	0
<b>Does not apply</b>	1	1.1
<b>Missing</b>	1	1.1
<b>Total</b>	95	100

Table 147. Survey II response - Question 6

<b>Did you participate in the drafting of any of the disaster plans?</b>		
	Frequency	Percent
<b>Yes</b>	57	60.0
<b>No</b>	38	40.0
<b>I don't know</b>	0	0
<b>Does not apply</b>	0	0
<b>Missing</b>	0	0
<b>Total</b>	95	100

Table 149. Survey II response - Question 8

<b>Does your disaster management plan include information on all hazard types (example: earthquakes, landslide, tsunami, extreme cold, floods, etc.)?</b>		
	Frequency	Percent
<b>Yes</b>	59	62.1
<b>No</b>	22	23.2
<b>I don't know</b>	8	8.4
<b>Does not apply</b>	3	3.2
<b>Missing</b>	3	3.2
<b>Total</b>	95	100

Table 150. Survey II response - Question 9

<b>Has your plan been shared with other agencies or organizations active in disaster management?</b>		
	Frequency	Percent
<b>Yes</b>	40	42.1
<b>No</b>	30	31.6
<b>I don't know</b>	20	21.1
<b>Does not apply</b>	3	3.2
<b>Missing</b>	2	2.1
<b>Total</b>	95	100

Table 151. Survey II response - Question 10A

<b>Are your organization's disaster plans updated regularly?</b>		
	Frequency	Percent
<b>Yes</b>	52	54.7
<b>No</b>	32	33.7
<b>I don't know</b>	9	9.5
<b>Does not apply</b>	1	1.1
<b>Missing</b>	1	1.1
<b>Total</b>	95	100

Table 152. Survey II response - Question 10B

<b>Are your organization's disaster plans tested, drilled or exercised regularly?</b>		
	Frequency	Percent
<b>Yes</b>	52	54.7
<b>No</b>	39	41.1
<b>I don't know</b>	1	1.1
<b>Does not apply</b>	1	1.1
<b>Missing</b>	2	2.1
<b>Total</b>	95	100

Table 153. Survey II response - Question 11

<b>Do your disaster plans address public outreach?</b>		
	Frequency	Percent
<b>Yes</b>	57	60.0
<b>No</b>	29	30.5
<b>I don't know</b>	6	6.3
<b>Does not apply</b>	3	3.2
<b>Missing</b>	0	0
<b>Total</b>	95	100



Table 154. Survey II response - Question 12

<b>Do your disaster plans address early warning?</b>		
	Frequency	Percent
<b>Yes</b>	58	61.1
<b>No</b>	32	33.7
<b>I don't know</b>	4	4.2
<b>Does not apply</b>	1	1.1
<b>Missing</b>	0	0
<b>Total</b>	95	100

Table 155. Survey II response - Question 13

<b>Do your disaster plans address evacuation?</b>		
	Frequency	Percent
<b>Yes</b>	74	77.9
<b>No</b>	16	16.8
<b>I don't know</b>	2	2.1
<b>Does not apply</b>	2	2.1
<b>Missing</b>	1	1.1
<b>Total</b>	95	100

Table 156. Survey II response - Question 14

<b>Do your disaster plans address logistics management (the movement of personnel and resources during times of disasters)?</b>		
	Frequency	Percent
<b>Yes</b>	64	67.4
<b>No</b>	19	20.0
<b>I don't know</b>	8	8.4
<b>Does not apply</b>	4	4.2
<b>Missing</b>	0	0
<b>Total</b>	95	100

Table 157. Survey II response - Question 15

<b>Do your disaster plans address shelter operations?</b>		
	Frequency	Percent
<b>Yes</b>	46	48.4
<b>No</b>	35	36.8
<b>I don't know</b>	5	5.3
<b>Does not apply</b>	8	8.4
<b>Missing</b>	1	1.1
<b>Total</b>	95	100

Table 158. Survey II response - Question 16

<b>Do your disaster plans address when and how to activate the Emergency Operation Center?</b>		
	Frequency	Percent
<b>Yes</b>	64	67.4
<b>No</b>	24	25.3
<b>I don't know</b>	3	3.2
<b>Does not apply</b>	2	2.1
<b>Missing</b>	2	2.1
<b>Total</b>	95	100

Table 160. Survey II response - Question 18

<b>Do your disaster plans address transportation during times of disasters?</b>		
	Frequency	Percent
<b>Yes</b>	46	48.4
<b>No</b>	34	35.8
<b>I don't know</b>	8	8.4
<b>Does not apply</b>	5	5.3
<b>Missing</b>	2	2.1
<b>Total</b>	95	100

Table 159. Survey II response - Question 17

<b>Does your organization have a separate standard operating procedure (SOP) for how to activate the Emergency Operation Center?</b>		
	Frequency	Percent
<b>Yes</b>	43	45.3
<b>No</b>	37	38.9
<b>I don't know</b>	11	11.6
<b>Does not apply</b>	2	2.1
<b>Missing</b>	2	2.1
<b>Total</b>	95	100

Table 161. Survey II response - Question 19

<b>Do your disaster management plans address emergency communications during times of disaster?</b>		
	Frequency	Percent
<b>Yes</b>	62	65.3
<b>No</b>	25	26.3
<b>I don't know</b>	3	3.2
<b>Does not apply</b>	4	4.2
<b>Missing</b>	1	1.1
<b>Total</b>	95	100

Table 162. Survey II response - Question 20

<b>Do your disaster plans address public works and engineering?</b>		
	Frequency	Percent
<b>Yes</b>	31	32.6
<b>No</b>	47	49.5
<b>I don't know</b>	8	8.4
<b>Does not apply</b>	3	3.2
<b>Missing</b>	6	6.3
<b>Total</b>	95	100

Table 164. Survey II response - Question 22

<b>Do your plans address search and rescue?</b>		
	Frequency	Percent
<b>Yes</b>	48	50.5
<b>No</b>	36	37.9
<b>I don't know</b>	5	5.3
<b>Does not apply</b>	5	5.3
<b>Missing</b>	1	1.1
<b>Total</b>	95	100

Table 163. Survey II response - Question 21

<b>Do your disaster plans address public health and medical services?</b>		
	Frequency	Percent
<b>Yes</b>	39	41.1
<b>No</b>	42	44.2
<b>I don't know</b>	5	5.3
<b>Does not apply</b>	6	6.3
<b>Missing</b>	3	3.2
<b>Total</b>	95	100

Table 165. Survey II response - Question 23

<b>Do your plans address oil and hazardous materials response (chemical, biological, radiological, etc.)?</b>		
	Frequency	Percent
<b>Yes</b>	26	27.4
<b>No</b>	49	51.6
<b>I don't know</b>	10	10.5
<b>Does not apply</b>	7	7.4
<b>Missing</b>	3	3.2
<b>Total</b>	95	100

Table 166. Survey II response - Question 24

<b>Do your plans address agriculture and natural resources?</b>		
	Frequency	Percent
<b>Yes</b>	27	28.4
<b>No</b>	51	53.7
<b>I don't know</b>	5	5.3
<b>Does not apply</b>	10	10.5
<b>Missing</b>	0	0
<b>Total</b>	95	100

Table 167. Survey II response - Question 25

<b>Do your plans address public safety and security?</b>		
	Frequency	Percent
<b>Yes</b>	36	37.9
<b>No</b>	47	49.5
<b>I don't know</b>	3	3.2
<b>Does not apply</b>	8	8.4
<b>Missing</b>	1	1.1
<b>Total</b>	95	100

Table 168. Survey II response - Question 26

<b>Do your plans address long-term community recovery?</b>		
	Frequency	Percent
<b>Yes</b>	37	38.9
<b>No</b>	37	38.9
<b>I don't know</b>	11	11.6
<b>Does not apply</b>	9	9.5
<b>Missing</b>	1	1.1
<b>Total</b>	95	100

Table 169. Survey II response - Question 27

<b>Does your organization have strong disaster management leadership?</b>		
	Frequency	Percent
<b>Yes</b>	62	65.3
<b>No</b>	22	23.2
<b>I don't know</b>	5	5.3
<b>Does not apply</b>	5	5.3
<b>Missing</b>	0	0
<b>Total</b>	95	100

Table 170. Survey II response - Question 28

<b>Do you think your organization has an effective disaster management program?</b>		
	Frequency	Percent
<b>Yes</b>	48	50.5
<b>No</b>	29	30.5
<b>I don't know</b>	12	12.6
<b>Does not apply</b>	3	3.2
<b>Missing</b>	3	3.2
<b>Total</b>	95	100

Table 171. Survey II response - Question 29

<b>How often are your SOPs reviewed and updated?</b>		
	Frequency	Percent
<b>Annual</b>	48	50.5
<b>Every 2 years</b>	13	13.7
<b>Every 5+ years</b>	6	6.3
<b>Not updated</b>	21	22.1
<b>Missing</b>	7	7.4
<b>Total</b>	95	100

## Participant Definitions of 'Effective Disaster Management'

<b>Respondent</b>	<b>Definition</b>
<b>1</b>	The one that takes into account all the entities involved in a comprehensive manner
<b>2</b>	The capability of responding to an event before its occurrence, to be more specific before, during and after
<b>3</b>	The response time given after an event so that it can be effective
<b>4</b>	Involve the local governments or authorities and all the inhabitants for disaster preparedness and to have contingency plans
<b>5</b>	To eliminate as many administrative procedures in the event of a disaster to be able to manage it the best way possible
<b>6</b>	An adequate management of available resources any time they are needed to respond to any type of event
<b>7</b>	<i>No definition provided</i>

<b>Respondent</b>	<b>Definition</b>
<b>8</b>	The manner in which people are trained to better respond to a disaster in a rapid and efficient manner
<b>9</b>	Considering threats known at every level of coordination: local, municipal, departmental, and national
<b>10</b>	Integration of all sectors in disaster management starting with preparedness and mitigation for a response and recovery that is able to reduce costs and lives
<b>11</b>	The compliance with standards and regulations in risk management and the operation of the CONRED system
<b>12</b>	The one that approaches risks in a holistic manner, as the participation with communities
<b>13</b>	The capability of the organization to face the critical solution of the disaster
<b>14</b>	When an immediate response is given to a disaster by knowing the steps that have to be followed in any type of emergency
<b>15</b>	<i>No definition provided</i>
<b>16</b>	Ours is very delayed because we have to follow a bidding process and quote for everything which impedes to work immediately in the event of a disaster. At this moment, the law will be reformed
<b>17</b>	When politics (laws) work together with institutional management, and the more active involvement of the population
<b>18</b>	Provide a timely, efficient and effective response, from prior information given by the communities. Through planning, using the resources necessary for a prompt recovery
<b>19</b>	All actions conducive to preventing, mitigating, responding, recovering from potential damages caused by threats at every level of the national territory
<b>20</b>	All actions before, during and after a disaster. Before: training, local organizations, standards. During: protocol, plan execution etc. After: rehabilitate disaster stricken areas

<b>Respondent</b>	<b>Definition</b>
<b>21</b>	Multi-disciplinary and comprehensive plan that aims at safeguarding human lives in the event of a natural or man- made disaster
<b>22</b>	A series of activities and actions before, during and after a disaster carried out on a timely fashion to benefit the population
<b>23</b>	When the population is organized and trained to prevent, mitigate, respond and reconstruct in the event of a threat, emergency, disaster to prevent them
<b>24</b>	Comprehensive decision making process for emergency preparedness and response
<b>25</b>	The excellent inter-agency coordination for the efficient response to disasters
<b>26</b>	Comprehensive process to manage vulnerabilities and threats thus reducing risks
<b>27</b>	Guatemala must adopt the necessary measure at every level to reduce the effects of natural phenomena and must work to guarantee a safe and sustainable development; that is the only manner in which we can have an efficient and comprehensive management
<b>28</b>	The efficient management of disasters is to execute a national action plan to reduce a disaster in a coordinated and comprehensive manner e.g. in case of an earthquake
<b>29</b>	<i>No definition provided</i>
<b>30</b>	An improvement initiative to assess and develop the capacity to manage and reduce risks
<b>31</b>	No; We are far away from having the monetary resources in our country. There is the will but we lack resources
<b>32</b>	When all decision makers get together and share all the management information they have, since due to lack of interest of the authorities we have not advanced in this issue and even less have a budget only for disaster management
<b>33</b>	Any time a strong event occurs such as an earthquake, seism, hurricanes leaving many injured people and the destruction of infrastructure and the loss of agriculture

<b>Respondent</b>	<b>Definition</b>
<b>34</b>	All actions and decisions undertaken and executed to prevent or manage an emergency or disaster.
<b>35</b>	Commitment to the role that each person in the team has to perform; teamwork, and the capacity to react or respond to a disaster
<b>36</b>	As a component in which there is an immediate comprehensive response in every level that responds to the needs of victims with quality and warmth
<b>37</b>	It means to respond to a vulnerability that can be solved rapidly and efficiently by means of a contingency plan, training and the awareness of victims
<b>38</b>	It is the training to avoid or prevent a disaster the best possible way with appropriate resources and professional staff
<b>39</b>	I think it is the efficient training and prevention at the level of the population because they are usually the most damaged by these events. At the institutional level, it means to raise the funds to invest in preparedness activities
<b>40</b>	<i>No definition provided</i>
<b>41</b>	As when you have a rapid response plan to avoid the loss of lives
<b>42</b>	A good management that allows reducing to a minimum the amount of lives lost during a disaster
<b>43</b>	Organizing and getting to know the threats that exist and how to use available resources adequately
<b>44</b>	When there is political leadership and the will for a proactive management in risk management
<b>45</b>	The process of the before, during and after a natural phenomenon
<b>46</b>	The work to be done before, during and after a disaster
<b>47</b>	<i>No definition provided</i>
<b>48</b>	Set of actions that allow for a better way to avoid the escalation of damages in a disaster and the loss of lives



<b>Respondent</b>	<b>Definition</b>
<b>49</b>	Capability to prevent, react in face of a disaster and the capability to go back to the original state before the disaster
<b>50</b>	Method and practices to prevent and act during an emergency and disaster
<b>51</b>	<i>No definition provided</i>
<b>52</b>	<i>No definition provided</i>
<b>53</b>	To successfully put into action all established procedures in an emergency
<b>54</b>	All the means used to mitigate, prevent a disaster in an efficient and effective manner
<b>55</b>	Work in preventive measures in an efficient manner involving all the population, both men and women
<b>56</b>	When the necessary resources and procedures are organized to respond to an affected area in the best way possible
<b>57</b>	The interaction with all the institutions to develop resilience among the disaster stricken areas
<b>58</b>	Every planning procedure to build awareness among the population
<b>59</b>	Political will to invest in risk management and education
<b>60</b>	<i>No definition provided</i>
<b>61</b>	The prior planning and organization to prepare for a disaster or potential disaster
<b>62</b>	<i>No definition provided</i>
<b>63</b>	The reactive or compensatory management to respond to the population
<b>64</b>	Have plans for the most common disasters, and leaving time for unforeseen events, having an immediate and efficient action plan
<b>65</b>	To be capable of implementing prevention and/or mitigation actions in vulnerable areas. In other words, to invest in projects that entail uprooting the problems identified in the country

<b>Respondent</b>	<b>Definition</b>
<b>66</b>	Approaching an event in any of the three specific bridges before, during and after to ensure effectiveness
<b>67</b>	Best preparedness, prevention and mitigation practices and vulnerability mitigation. Also, responding efficiently to disasters
<b>68</b>	Anticipate to disasters, and an efficient planning
<b>69</b>	When there are prevention plans
<b>70</b>	Prevention – mitigation – preparedness – response Actions that allow to anticipate
<b>71</b>	Include prevention, mitigation, response and preparedness actions to develop a comprehensive and efficient plan
<b>72</b>	A process in which integration, prevention, preparedness, mitigation, response, recovery and reconstruction processes exist in the event of a disaster
<b>73</b>	Prevention, reaction and immediate response to reduce human losses
<b>74</b>	It is a very well organized plan with good training for all co- workers in the organization
<b>75</b>	As an organized protocol and with operational tasks carried out on a timely and coordinated manner in face a R.E.D. situation
<b>76</b>	Be aware, and with full openness to train and acquire basic knowledge to prepare, prevent, act, and perform in face of an emergency or disaster
<b>77</b>	To broaden management before, during and after the event. To provide a better risk and threat management
<b>78</b>	When all coordinating organizations work together like a gear to perform as best possible
<b>79</b>	To be prepared to manage a disaster and prevent risks
<b>80</b>	Organization, prevention and dissemination of policies, procedures in a disaster
<b>81</b>	Compliance with standards in the event of disasters

<b>Respondent</b>	<b>Definition</b>
<b>82</b>	An adequate relationship between coordination and availability of resources for preparedness, response and recovery
<b>83</b>	The prevention of disasters, that is the preparation and prevention of disasters and the execution of a work plan to prevent disasters. Constant staff training and of human beings in general
<b>84</b>	<i>No definition provided</i>
<b>85</b>	Set of procedures or interventions for disaster management
<b>86</b>	A concrete way to solve and respond to a disaster at the governmental, social and natural levels
<b>87</b>	The most expeditious manner to reach a disaster zone and accelerate the reconstruction of the tragedy and provide psychological assistance
<b>88</b>	Tall measures and inter-agency coordination to safeguard the life, health, goods, materials, etc. of the population through prevention, mitigation, and reconstruction
<b>89</b>	To have the capability to coordinate in order to be prepared beforehand and better care of a disaster situation before and after the disaster
<b>90</b>	Respond and be prepared for a disaster, and provide effective assistance and help victims of a disaster
<b>91</b>	It is the joint work of governmental and private institutions for the prevention or mitigation of disasters
<b>92</b>	It is the one that allows to reduce victims
<b>93</b>	<i>No definition provided</i>

# Appendix E: CDM Survey III

## Introduction

As part of comprehensive disaster management (CDM) data gathering efforts, stakeholder participants completed a third survey during the NDPBA Knowledge Exchange II in Guatemala City, Guatemala, on 07 February 2017. Survey III explored aspects of disaster response activities within the country, including resources and capacity building, damage and needs assessments, staffing, roles and responsibilities during disaster response operations, budget allocations, early warning system usage, the existence of mutual-aid agreements, response partnerships and collaboration, and the operationalization of Emergency Operations Centers. Survey III included 21 questions, six of which required short answer responses. Frequency tables of responses to survey questions 1-15 are included for reference.

Table 172. Organizational affiliation of survey respondents (CDM Survey III)

Organizational Affiliation of Survey Respondents	Number	Percent (%)
<b>Central Government</b>	37	45%
<b>Local Government</b>	9	11%
<b>INGOs</b>	9	11%
<b>UN</b>	0	0%
<b>Universities</b>	0	0%
<b>Other</b>	1	1%
<b>Not stated</b>	27	32%

Table 173. Age of survey respondents (CDM Survey III)

Age of Survey Respondents (years)	Number	Percent (%)
<b>18-25</b>	4	5%
<b>26-30</b>	8	10%
<b>31-40</b>	29	35%
<b>41-50</b>	22	27%
<b>51-60</b>	11	13%
<b>61-65</b>	1	1%
<b>Over 65</b>	1	1%
<b>Not stated</b>	7	8%

Table 174. Gender of survey respondents (CDM Survey II)

Gender of Survey Respondents	Number	Percent (%)
Female	30	36%
Male	47	57%
Not stated	6	7%

Survey responses were validated through interviews conducted over the course of the project. Interview subjects represented national and subnational government organizations and NGOs, and included leaders and specialists in disaster management.

## Frequency Tables of CDM Survey III Responses

Table 175. Survey III response - Question 1

Is your organization active in disaster response?		
	Frequency	Percent
Yes	65	78.3
No	14	16.9
I don't know	3	3.6
Does not apply	0	0
Missing	1	1.2
<b>Total</b>	<b>83</b>	<b>100</b>

Table 176. Survey III response - Question 2

In your opinion, was the national response to the last major disaster effective?		
	Frequency	Percent
Yes	42	50.6
No	32	38.6
I don't know	6	7.2
Does not apply	2	2.4
Missing	1	1.2
<b>Total</b>	<b>83</b>	<b>100</b>

Table 177. Survey III response - Question 3

Do you feel that disaster alert/warning messages were issued effectively during the last disaster?		
	Frequency	Percent
Yes	27	32.5
No	43	51.8
I don't know	10	12.0
Does not apply	2	2.4
Missing	1	1.2
<b>Total</b>	<b>83</b>	<b>100</b>

Table 178. Survey III response - Question 4

<b>In your opinion, was the mobilization of resources and response personnel effective during the last disaster?</b>		
	Frequency	Percent
<b>Yes</b>	49	59.0
<b>No</b>	26	31.3
<b>I don't know</b>	7	8.4
<b>Does not apply</b>	1	1.2
<b>Missing</b>	0	0
<b>Total</b>	83	100

Table 180. Survey III response - Question 6

<b>Is your organization responsible for post-disaster damage and needs assessments?</b>		
	Frequency	Percent
<b>Yes</b>	25	30.1
<b>No</b>	45	54.2
<b>I don't know</b>	6	7.2
<b>Does not apply</b>	3	3.6
<b>Missing</b>	4	4.8
<b>Total</b>	83	100

Table 179. Survey III response - Question 5

<b>Does your organization have pre-established agreements for support during times of disaster (i.e. mutual aid agreements)?</b>		
	Frequency	Percent
<b>Yes</b>	51	61.4
<b>No</b>	19	22.9
<b>I don't know</b>	12	14.5
<b>Does not apply</b>	1	1.2
<b>Missing</b>	0	0
<b>Total</b>	83	100

Table 181. Survey III response - Question 7A

<b>Were post-disaster damage and needs assessments conducted following the last major disaster?</b>		
	Frequency	Percent
<b>Yes</b>	54	65.1
<b>No</b>	14	16.9
<b>I don't know</b>	9	10.8
<b>Does not apply</b>	3	3.6
<b>Missing</b>	3	3.6
<b>Total</b>	83	100

Table 182. Survey III response - Question 7B

<b>If yes, were they done accurately?</b>		
	Frequency	Percent
<b>Yes</b>	29	34.9
<b>No</b>	17	20.5
<b>I don't know</b>	11	13.3
<b>Does not apply</b>	3	3.6
<b>Missing</b>	23	27.7
<b>Total</b>	83	100

Table 183. Survey III response - Question 8A

<b>Does your organization maintain an Emergency Operations Center?</b>		
	Frequency	Percent
<b>Yes</b>	46	55.4
<b>No</b>	32	38.6
<b>I don't know</b>	3	3.6
<b>Does not apply</b>	1	1.2
<b>Missing</b>	1	1.2
<b>Total</b>	83	100

Table 184. Survey III response - Question 7B

<b>If yes, does the Emergency Operations Center have adequate resources to perform its responsibilities effectively?</b>		
	Frequency	Percent
<b>Yes</b>	22	26.5
<b>No</b>	32	38.6
<b>I don't know</b>	3	3.6
<b>Does not apply</b>	2	2.4
<b>Missing</b>	24	28.9
<b>Total</b>	83	100

Table 185. Survey III response - Question 9

<b>In your opinion, does your organization have adequate staffing to conduct disaster response?</b>		
	Frequency	Percent
<b>Yes</b>	43	51.8
<b>No</b>	32	38.6
<b>I don't know</b>	2	2.4
<b>Does not apply</b>	3	3.6
<b>Missing</b>	3	3.6
<b>Total</b>	83	100

Table 186. Survey III response - Question 10

<b>Does your organization have a training program to help develop and build capacity in disaster management staff members?</b>		
	Frequency	Percent
<b>Yes</b>	43	51.8
<b>No</b>	36	43.4
<b>I don't know</b>	3	3.6
<b>Does not apply</b>	1	1.2
<b>Missing</b>	0	0
<b>Total</b>	83	100

Table 187. Survey III response - Question 11

<b>In your opinion, are disaster response tasks clearly defined?</b>		
	Frequency	Percent
<b>Yes</b>	43	51.8
<b>No</b>	36	43.4
<b>I don't know</b>	3	3.6
<b>Does not apply</b>	0	0
<b>Missing</b>	1	1.2
<b>Total</b>	83	100

Table 188. Survey III response - Question 12

<b>In your opinion, is there overlap between organizations active in disaster response in Guatemala?</b>		
	Frequency	Percent
<b>Yes</b>	45	54.2
<b>No</b>	18	21.7
<b>I don't know</b>	16	19.3
<b>Does not apply</b>	1	1.2
<b>Missing</b>	3	3.6
<b>Total</b>	83	100

Table 189. Survey III response - Question 13

<b>Does your organization engage with the military to support disaster response?</b>		
	Frequency	Percent
<b>Yes</b>	52	62.7
<b>No</b>	23	27.7
<b>I don't know</b>	5	6.0
<b>Does not apply</b>	3	3.6
<b>Missing</b>	0	0
<b>Total</b>	83	100



Table 190. Survey III response - Question 14

<b>Does your organization engage with the private sector to support disaster response?</b>		
<b>Frequency</b>		
<b>Percent</b>		
	Frequency	Percent
<b>Yes</b>	46	55.4
<b>No</b>	27	32.5
<b>I don't know</b>	8	9.6
<b>Does not apply</b>	2	2.4
<b>Missing</b>	0	0
<b>Total</b>	83	100

Table 192. Survey III response - Question 15B

<b>If yes, was the budget adequate for the last disaster response your organization conducted?</b>		
	Frequency	Percent
<b>Yes</b>	13	15.7
<b>No</b>	19	22.9
<b>I don't know</b>	9	10.8
<b>Does not apply</b>	8	9.6
<b>Missing</b>	34	41
<b>Total</b>	83	100

Table 191. Survey III response - Question 15A

<b>Does your organization have a budget allocated for disaster response?</b>		
	Frequency	Percent
<b>Yes</b>	27	32.5
<b>No</b>	41	49.4
<b>I don't know</b>	11	13.3
<b>Does not apply</b>	1	1.2
<b>Missing</b>	3	3.6
<b>Total</b>	83	100



## Participant Definitions of 'Effective Disaster Response'

<b>Respondent</b>	<b>Definition</b>
<b>1</b>	As the option to solve the need of one or a group of persons whose lives are threatened in face of the occurrence of a natural or man-made disaster.
<b>2</b>	Prior organization and preparation at all levels, decision making and measures undertaken when an event occurs (after monitoring) damage assessment and response of the impacted population.
<b>3</b>	First to assess damages, equity, inclusion and efficiency.
<b>4</b>	Appropriate management responding to the special features of each scenario, and based on equity, inclusion, and resilience capacity.
<b>5</b>	It is the set of actions that lead to guarantee a better response, safeguarding the life of the population.
<b>6</b>	Provide the necessary response on a timely manner.
<b>7</b>	Give immediate assistance to family members and undertake all the measures necessary.
<b>8</b>	N/A
<b>9</b>	N/A
<b>10</b>	Proceed under the protocol and take care of the emergency with diligence.
<b>11</b>	Immediate presence with trained staff, and an organization with the appropriate support and government leadership.
<b>12</b>	N/A
<b>13</b>	Organization, training at every institutional and community level.
<b>14</b>	A good organization to mitigate in all areas.
<b>15</b>	The one that minimizes damages and human and material damages and losses in a disaster.

<b>Respondent</b>	<b>Definition</b>
<b>16</b>	It means to put into practice all response plans at every level through drills and simulations.
<b>17</b>	Create the necessary basic conditions to return the population to the conditions they enjoyed before the disaster.
<b>18</b>	N/A
<b>19</b>	It is the way we are prepared and trained with all the knowledge, to face any disaster situation.
<b>20</b>	As the immediate action previously planned to take care, confront and mitigate a disaster event in a timely and positive manner in case of potential vulnerabilities
<b>21</b>	Actions to rapidly respond to the victims and do our protection work.
<b>22</b>	When everyone responds to an emergency in the best way.
<b>23</b>	It is an action taken in an organized manner, based on the fact that the means exist, as well as the inputs, tools necessary to provide a timely response.
<b>24</b>	In principle to safeguard human lives and pets.
<b>25</b>	The one that produces the effect desired to control each threat and this prepares us to respond to any natural or man-made disaster.
<b>26</b>	It is the way in which lives are saved in the event of a natural disaster.
<b>27</b>	That all institutions accountable that are part of SINAPRED respond in time at the moment that an event occurs.
<b>28</b>	N/A
<b>29</b>	As a measure implemented to save lives.
<b>30</b>	Respond with all resources available and necessary to contribute to the welfare of victims.
<b>31</b>	N/A

<b>Respondent</b>	<b>Definition</b>
<b>32</b>	N/A
<b>33</b>	All the structures that participate during an alert and after the disaster.
<b>34</b>	It is the capability to respond effectively to provide immediate short and medium term measures.
<b>35</b>	Immediate response during disasters with the full participation and support of groups and human resources.
<b>36</b>	Timely recovery capacity, and resilience of communities.
<b>37</b>	N/A
<b>38</b>	Includes the preparedness and organization before an event occurs.
<b>39</b>	Organizing and planning the first response to save lives.
<b>40</b>	Set of activities that meet to respond to a natural event.
<b>41</b>	N/A
<b>42</b>	That all the goals set were achieved at the end of the exercise.
<b>43</b>	Speed, responsibility and solidarity.
<b>44</b>	Planning for preparedness, agility and effectiveness during recovery.
<b>45</b>	When the prevention system is well organized. When the purpose is to safeguard the lives of families.
<b>46</b>	It is the preparation and knowledge to respond to a threat before, during and after an event.
<b>47</b>	Comprehensive, in other words, local, departmental, and national levels in every field.
<b>48</b>	An efficient response including a good organization where the tasks of each person are defined and also for each structure.

<b>Respondent</b>	<b>Definition</b>
<b>49</b>	One that has been efficient where we have achieved our goal, such as to safeguard human lives and protect as much as possible during an event. The impact is less thanks to prior organization.
<b>50</b>	Regarding our institution, it is timely information, early alert and complete and correct assessment of the event.
<b>51</b>	The speed with which the government undertakes the role as the leader to mitigate the consequences of a natural or man-made disaster.
<b>52</b>	The capacity to assist and guide the population struck by the natural event, be able to assess, help with recovery, food, infrastructure, etc.
<b>53</b>	When we can get the data on the same day about victims affected by the disaster.



# Better solutions. Fewer disasters. Safer world.

NDPBA Guatemala Final Report  
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