

A satellite-style map of the Americas, showing North and South America. Guatemala is highlighted with a red outline. A semi-transparent grey box with a grid pattern contains the word "Guatemala" in white text. The map shows the Atlantic Ocean to the east and the Pacific Ocean to the west.

Guatemala

**Adaptation to climate change in
Guatemala:
Efforts by the Ministry of Environment and
Natural Resources, Guatemala**

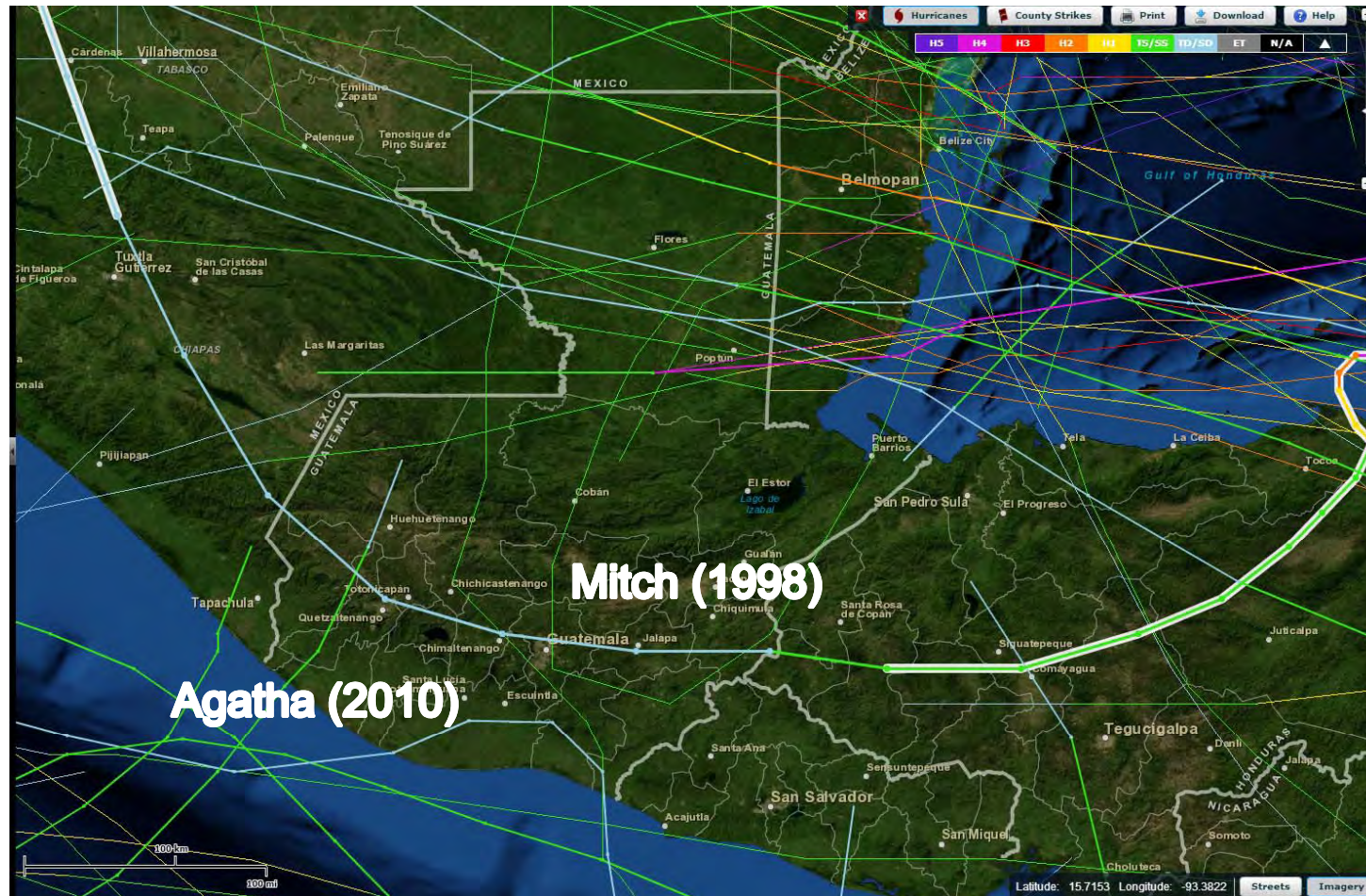
**José David Díaz González
Ministry of Environment and Natural Resources, GUATEMALA
Jakarta, September 2, 2013**

Background and National Context



- **Area 108,889 km²**
- It is located between three tectonic plates: Cocos, Caribbean and North America
- 34 volcanoes (four of them active)

Background and National Context



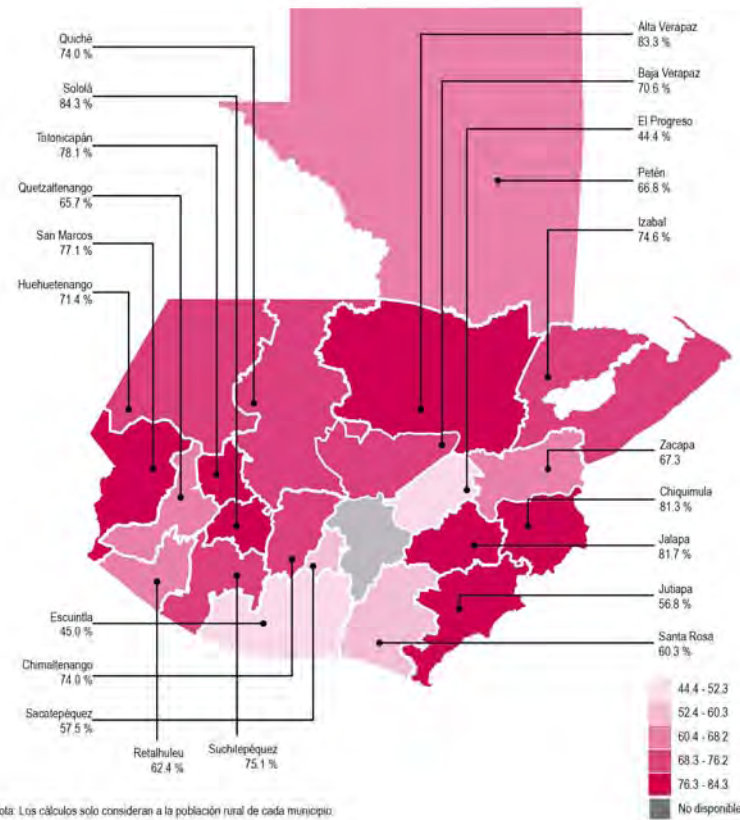
- Hurricane belt of the Atlantic Ocean and Tropical Storms of the Pacific Ocean.
- Coast spans 254 km of Pacific coastline and 148 km of Caribbean coastline (402 km total), and its marine extension is estimated to be more than 116,000 km²

About the country

Population (2011)=	14,713,763
Birth rate =	2.45%
Population density	135.12 hab/Km2
Income level	Lower middle income



MAPA 1 GUATEMALA RURAL: TASA DE POBREZA TOTAL POR DEPARTAMENTO, 2011



Nota: Los cálculos solo consideran a la población rural de cada municipio.

Guatemala, is a vulnerable country

Economical

- Economy based on agriculture
- Impact in GDP: Mitch (1998) 4.1%; Stan (2005) 3.6%; Agatha (2010) 2.6
- Tax burden: 10.8%
- Lack of diverse manufacturing sector

Social

- Human Development Index: 0.702
- GINI Index: 0.585
- GDP \$50.81 billion (2012)
- Decades of civil war (36 years)
- Vast difference between the rural and urban
- Malnutrition: 48% in children under 5 years

Natural

- 3 tectonic plaques
- 34 volcanoes (4 active)
- Marine climate regime
- Hurricane belt of the Atlantic ocean and Tropical Storms of the Pacific Ocean

Environmental

- Environment degraded and impoverished by overexploitation
- High levels of deforestation (net loss 38,597 ha / year) and soil erosion (244,718,047 tons / year)
- Environmental Pollution: Water 92%

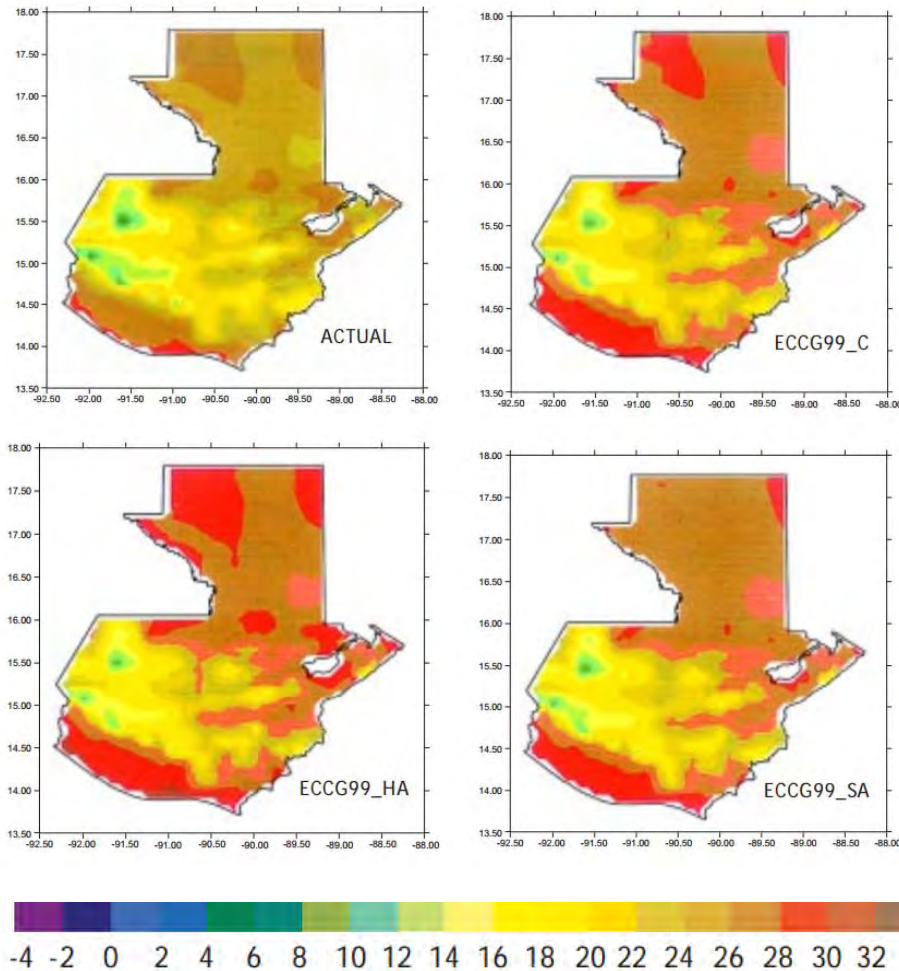
Magnified vulnerability due to Climate Change

About Climate change in Guatemala

- Although Guatemala contributes to less than 0.1% of the World's emission of greenhouse gases, our country is being seriously impacted by the climate change and variability.
- Intensity and frequency of extreme events have increased.

Climate change scenarios: Temperature

Temperature
2050

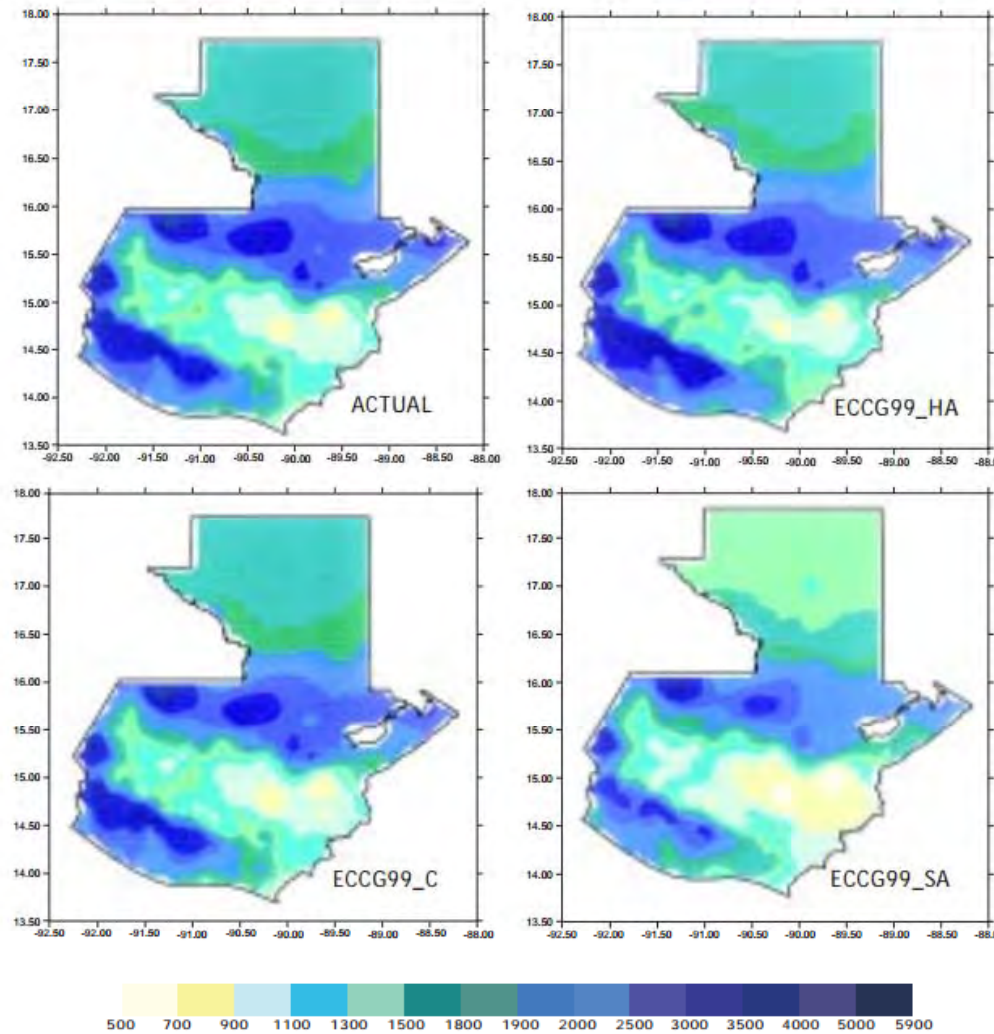


Recent Trends	
Maximum Temperatures	0.2°C per decade ▲
Minimum Temperatures	0.3°C per decade ▲
Number of Warm Days	2.5% ▲
Number of Warm Nights	1.7% ▲

Data:
The World Bank (2013)

Climate change scenarios: Precipitation

Precipitation
2050



Negative Effects

- Loss of habitat
- Infraestructure and services
- Food security
- Hydrological resources
- Soil erosion processes
- Increase of diseases related to weather
- Tourism

This situation affects mainly the rural and urban marginal population. Consecuently to people in extreme poverty



RESPONSE TO CLIMATE CHANGE

- Policy measures:
 - First National Communication on Climate Change (MARN 2001)
 - **Climate Change National Policy (MARN 2009)**
 - National Policy for the Integrated Management of Marine Coastal Zones (MARN 2009)
 - Climate Change Regional Strategy (2010).
 - Law Initiative to Regulate the Reduction of Vulnerability, Obligatory Adaptation Facing Climate Change and the Mitigation of GHG Effects (MARN 2009)
 - Second National Communication on Climate Change (In progress)
 - Readiness Preparation Proposal (RPP) for REDD+

RESPONSE TO CLIMATE CHANGE

- According to the Climate Change Policy:
 - Development of national capacities and technology transfer
 - Reduction of vulnerability and improvement of **adaptation measures** and risk management
 - Mitigation of Climate Change



Some adaptation measures from the Government of Guatemala

- Adjustment of production practices to promote food security
 - **Zero hunger pact**
 - **Sustainable Forest Management and Multiple Environmental Benefits (GEF Financed Project)**
 - **Integrated management and protection of resources in the Dry Corridor, for climate change adaptation (KFW Financed Project)**
- Conservation of natural ecosystems for the maintenance of ecosystem services for climate change adaptation
 - **Conservation and Sustainable use of Biodiversity in Coastal and Marine Protected Areas**



Decision support tools on the making (using space-based information)

ADAPTATION

Management of water resources

- Project "Water Security and Climate Change in Central America and the Caribbean" pilot project in the Samalá basin in the Pacific.
 - CATHALAC and Universidad de San Carlos
 - Models to improve knowledge of sites vulnerable to hydrological events through remote sensing.
 - Intends to use models to improve policy-making on a local level.



ADAPTATION



- Monitoring of Territorial Dynamics in Guatemala, through the use of FORMOSAT Satellite Imagery

- Environmental monitoring (MARN)
 - Dynamics of water bodies (for largest lakes in the country)
- Initiative, includes other subjects: territorial planning and risk management

Project pending administrative issues from both parties

ADAPTATION

Study of Mangrove cover for year 2012 through the use of Landsat Imaginery

- Financed by UNEP and the Government of Spain
- Colaboration between MARN and CATHALAC
- Update expected every 2 to 3 years.



MITIGATION



FOR REDD+

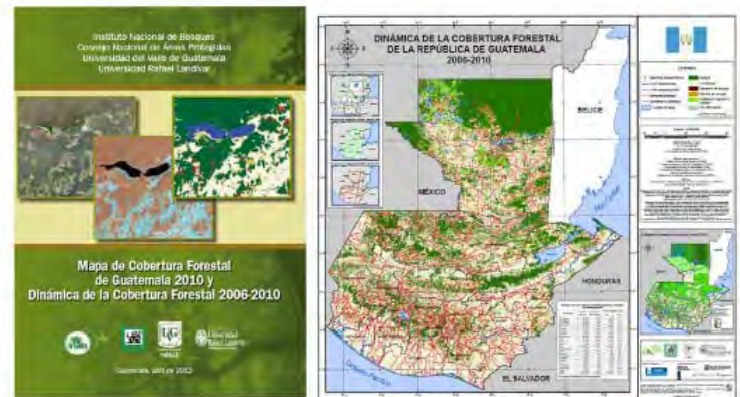
- Land use map using high resolution images (RapidEye) donated by GIZ
 - Assist in improvement of information for the Land Use, Land-Use Change and Forestry as part of the country's report to the UNFCCC.



MITIGATION

— REDD+

- Forest dynamics (2001 - 2006 and 2006-2010) and historical maps (1986 and 1991)
- Forest fires (Geospatial Information System for fire Management in the Republic of Guatemala, 2009)



Other ongoing initiatives

MITIGATION INICIATIVES

- Promote low carbon economy through Low Emission Development Strategies (LEDS), financed through USAID Guatemala.

Still to be addressed...

- Statistical downscaling of National Climate Change Scenario
- Analysis of forest and land use with very high resolution data for areas with particular dynamics (high gain or high loss of forest cover)
- Further work needs to be done for these subjects which require space-based information:
 - Use of satellite products describing air quality and monitoring of pollutants through satellite data
 - Modeling and interpretation of aerosols and air pollution events based on MODIS sensors.

For further information

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Gracias Thank you



No country is risk free.
Is how one manages risk what makes the difference