

DOMINICAN REPUBLIC

Hurricanes and Earthquakes

RISK PROFILE

What is a country **disaster risk** profile?

An estimation of the potential economic losses to property caused by adverse natural hazards.

Country Disaster Risk Profile

Applications

- ▷ **Inform** disaster risk financing
- ▷ **Develop** key baseline data
- ▷ **Evaluate** impact of disasters
- ▷ **Promote and inform** risk reduction

Country **At-A-Glance**

GDP US\$ **71.6 billion** (2016) | Population **10.6 million** (2016) | Total Building Exposure US\$ (Replacement Value) **153.1 billion**

Population

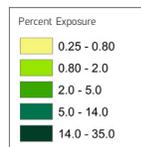
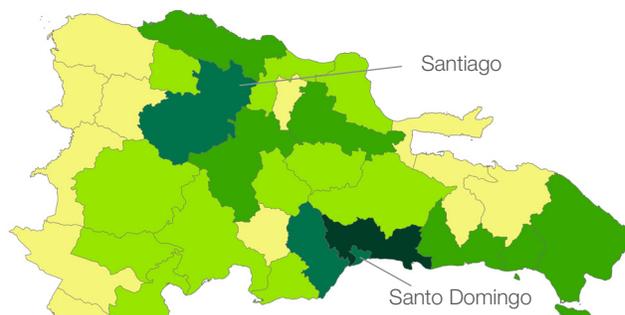


Gross Capital Stock



What is **at risk**?

Economic assets such as residential and non-residential buildings are at risk. These assets that are exposed to natural disasters are referred to as a country's **Building Exposure**.



The map provides the value of residential and non-residential buildings at risk from hurricanes and earthquakes in each province.



Snapshot

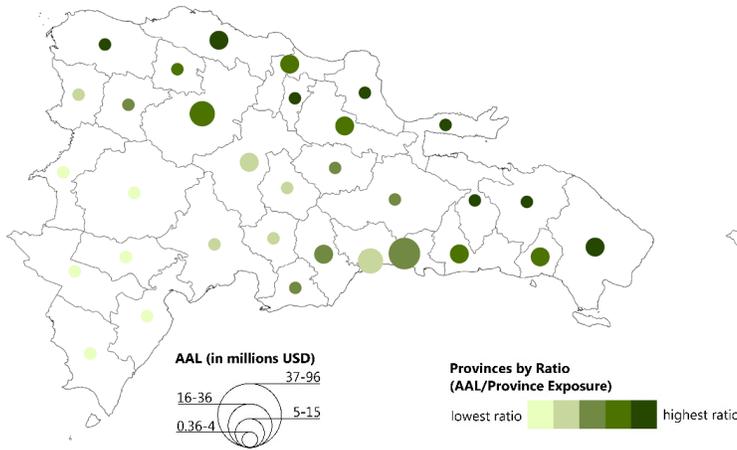
▷ Potential losses from **hurricanes** are **more significant** than earthquake losses during shorter return periods. Potential losses for longer return periods are of a **similar level** for hurricanes and **earthquakes**.

▷ Annual Average Loss (AAL) from **hurricanes** is **US\$ 345M (0.48% of GDP)**, and from **earthquakes** is **US\$ 297M (0.41% of GDP)**.

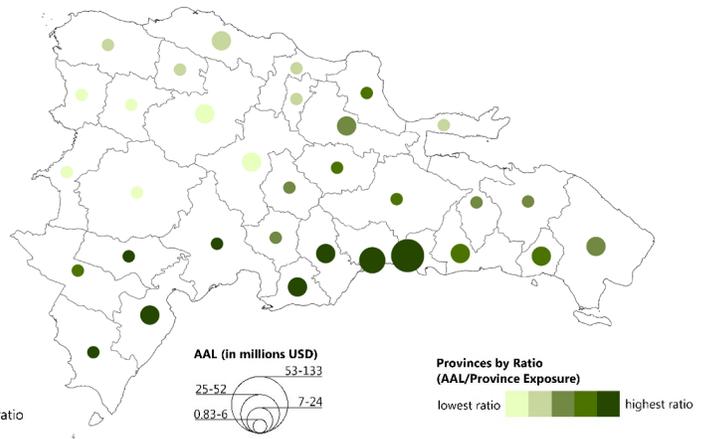
▷ The Probable Maximum Loss (PML) for **hurricanes** (250-year return period) is at least **US\$ 11,482M (16.0% of GDP)**, and for **earthquakes** at least **US\$ 11,112M (15.5% of GDP)**.

Two representations of earthquake and hurricane risk

Earthquake Risk



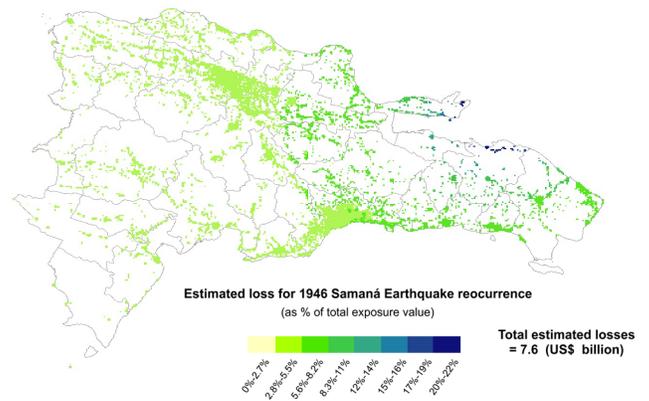
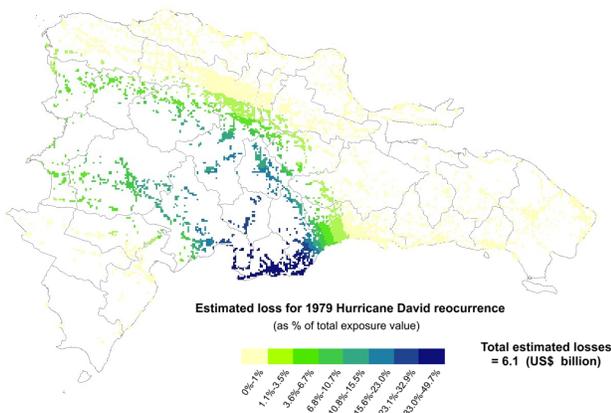
Hurricane Risk



Absolute Risk: The larger the circle, the higher the Annual Average Losses (AAL) that the province could potentially incur over the long term.

Relative Risk: The darker the color, the higher the ratio of AAL/Province Exposure. For earthquake risk, the darkest color represents the province of Samaná which has a higher proportion of vulnerable structures due to construction types and/or potentially higher seismic intensity. For hurricane risk, the darkest color represents the province of Pedernales, which has a higher proportion of vulnerable structures due to construction types and/or potentially higher hurricane intensity.

What would be the losses today if a historical event were to reoccur?



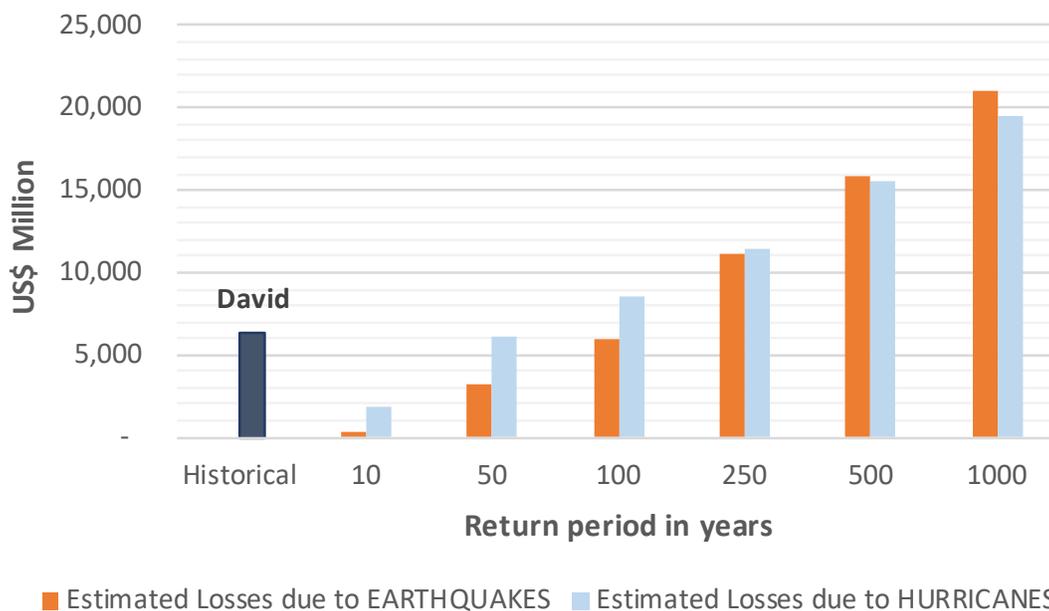
In 1979, the Dominican Republic was affected by Hurricane David. If this hurricane had happened in 2016, it would have caused losses of more than US \$ 6.1 billion.

If the earthquake of magnitude 8.0 on the Richter scale that occurred in the Samaná peninsula in 1946 would have happened in 2016, it would have caused losses of US \$7.6 billion.

Name of Event	Year of Event	Estimated losses with current exposure (US\$ billion)	Losses (% of total exposure)	Losses (% of GDP, 2016)
Santiago Earthquake	1562	11.6	7.5%	16.2%
Azuza Earthquake	1751	11.1	7.2%	15.5%
San Zenón Hurricane	1930	14.9	9.7%	20.8%
Samaná Earthquake	1946	7.6	4.9%	10.6%
Hurricane David	1979	6.1	4.0%	8.5%
Georges	1998	2.7	1.8%	3.8%

What are the potential future losses?

The following table and chart show the estimated potential future losses in the Dominican Republic that could be caused by earthquakes and/or hurricanes for a given return period. For any given return period, the probability of reaching the indicated loss level is equal to or greater than one. The annual exceedance probability is calculated as the inverse of the return period.



Return Period	Annual Exceedance Probability	Earthquakes		Hurricanes	
		Losses (US\$ M)	Losses (% of GDP, 2016)	Losses (US\$ M)	Losses (% of GDP, 2016)
50	2.00%	3,176	4.4%	6,124	8.6%
100	1.00%	5,960	8.3%	8,573	12.0%
250	0.40%	11,112	15.5%	11,482	16.0%
500	0.20%	15,867	22.2%	15,616	21.8%
1000	0.10%	21,079	29.4%	19,443	27.2%
Annual Average Loss (AAL)		297	0.4%	345	0.5%

These estimates represent the first step towards the quantification of contingent liabilities associated with disasters. These losses include only direct losses to the exposure of the country, measured in terms of real estate. Next steps include determining the impact of these national losses for the Government, in fiscal and budgetary terms. This would directly inform specific actions that could be taken to improve the management of contingent liabilities associated with disasters.

Glossary

The Annual Average Loss (AAL) is an estimate of the potential losses incurred each year and corresponds to the average of all the losses incurred over the very long term.

The Probable Maximum Loss (PML) is an estimate of the level of potential losses that is likely to be reached if an event or series of events, with certain probability, occurs. For example, the PML corresponding to a return period of 100 years is the estimated loss caused by an event that occurs every 100 years on average (which means that it has a 1% probability of occurrence per year).

The Exceedance Probability Curves (EP Curve) describes the probability of reaching and exceeding a given level of losses. It can be interpreted in two ways: if you start from the level of losses, the EP curve allows you to determine the probability that this level of losses will be reached (or exceeded); On the other hand, starting from the probability level, the EP Curve allows you to determine the level of losses that corresponds to that probability.

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