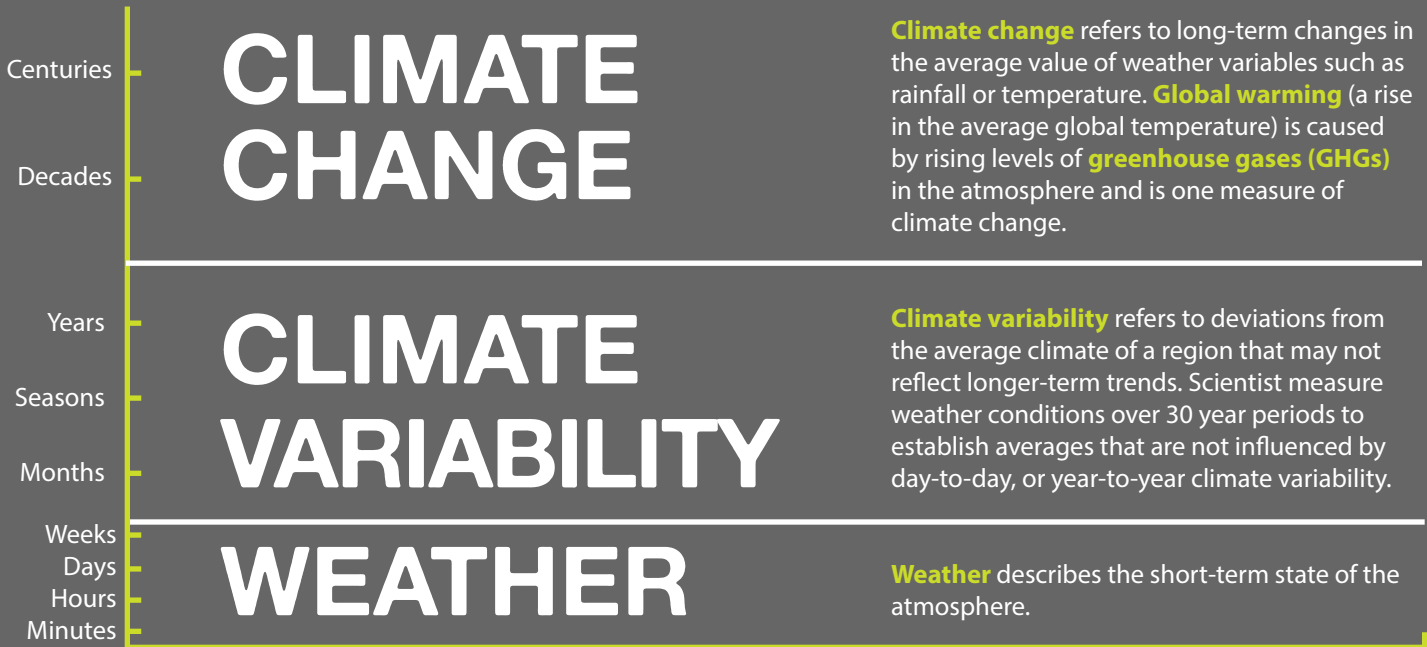


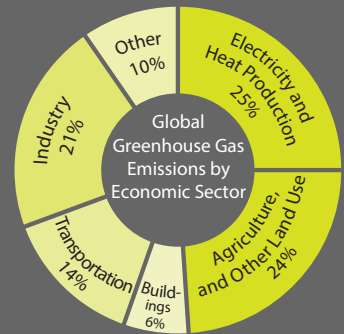
THE BASICS:

CLIMATE CHANGE

What is "CLIMATE"? The term *climate* refers to the larger, long-term systems in which weather takes place. The climate of a place includes things like temperature, rainfall, and wind averaged over a long period of time, usually 30 years.



- The gases in the atmosphere that absorb radiation are known as **greenhouse gases (GHGs)**, like carbon dioxide (**CO₂**), methane (**CH₄**), and nitrous oxide (**N₂O**). GHGs absorb infrared radiation from the sun and trap the heat in the atmosphere, contributing to **global warming**.
- 2015** was the hottest year on record, with **1.57°F higher** than the average from 1951-1980.
- 20-30% of GHG emission** are generated by agriculture and food systems.
- Agriculture** is the largest contributor of non-CO₂ GHGs.
- United Nations predicts **30% rise** in agriculture's GHGs emissions by 2050.



CLIMATE CHANGE INDICATORS

- | | | |
|--------------------------|----------------------------------|--|
| Glaciers & Ice sheets | Number of hot days per year | Number of cold days per year |
| Arctic sea ice | Air temperatures | Changing rainfall pattern |
| Sea surface temperatures | Changing Southern Ocean currents | Intensity and frequency of extreme weather events (e.g. fires, floods) |
| Ocean heat Content | Sea levels | |
| Ocean acidification | | |

Climate Projections for Puerto Rico and U.S. Virgin Islands



Future climate scenarios in the Caribbean show increasing temperatures, rising sea levels, shifting rainfall patterns, and more intense tropical storms and hurricanes as a result of global climate change.

Potential Climate Change Effects, Risk and Vulnerabilities

- Puerto Rico is expected to warm faster than the global average, with **increases in both mean and extreme temperatures**, including more days per year over 95°F and nights warmer than 85°F.
- **Rainfall will decrease**, particularly in the wet season, with more frequent dry days.

- The frequency of **moderate extreme precipitation** (over 1 inch of rain) will decrease, while more extreme precipitation (over 3 inches of rain in a day) will be more common.

Source: Hayhoe, K. 2013. Quantifying Key Drivers of Climate Variability and Change for Puerto Rico and the Caribbean.

- Projected temperature changes are large enough to affect temperature sensitive crops, species, and ecosystems, while the combined effects of changes in temperature and precipitation are likely to increase the demand for energy, the risk of water stress and drought, and the risk of impacts from heavy rainfall events.

How does climate change affect agriculture and forestry in the Caribbean?

Scarcity of water for irrigation. Drought decreases the environmental carrying capacity and productivity of the soil. Sea level rise can cause the salinization of aquifers and loss of agricultural lands on the coast.

Increased incidence of pests. Changes in temperature and humidity increase the vulnerability of agrosystems to pests & introduced species.

Food insecurity. Changes in rainfall patterns and temperatures affect the timing of agricultural production and crop yields, affecting food prices and availability.

Low livestock productivity. Drought, heat stress, and dry pastures reduce the availability of feed, which increases animal mortality and increases the cost of production by increased use of concentrate feed.

Social vulnerability. Populations and prime agricultural lands are located in coastal areas, vulnerable to sea level rise. Only 16% of farms have crop insurance coverage and 68% of farms have a net household income of less than \$20,000 making the vulnerability to climate change among Puerto Rico's farmers very high.



I'm a farmer or forest landowner, what can I do to build climate resilience?

To address the challenges climate change poses to agriculture, the USDA is encouraging producers and land managers to join their local Climate Hub network. The Hubs are connecting farmers and agricultural advisors with the right people, science, and information they need to adapt and mitigate climate change.

The Caribbean Climate Hub is collaborating with the local Departments of Agriculture and Natural Resources, NRCS, ARS, universities, extension services, experimental stations, and community organizations to develop and deliver educational material and tools to help improve yields and climate resilience.

Your participation is important! Please contact us by email and let us know:

Who you are and what types of crops you are cultivating?

What are the most serious challenges you are facing?

What sources do you rely on for information and advice?

How can we best help you prepare for a changing climate?

USDA Caribbean Climate Hub (Centro Climático del Caribe)

Find resources & tools in our website: caribbeanclimatehub.org
 Contact us: caribbeanclimatehub@gmail.com
 International Institute of Tropical Forestry, Río Piedras, Puerto Rico



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