

# Extreme weather early warning systems: bridging the climate science – health divide

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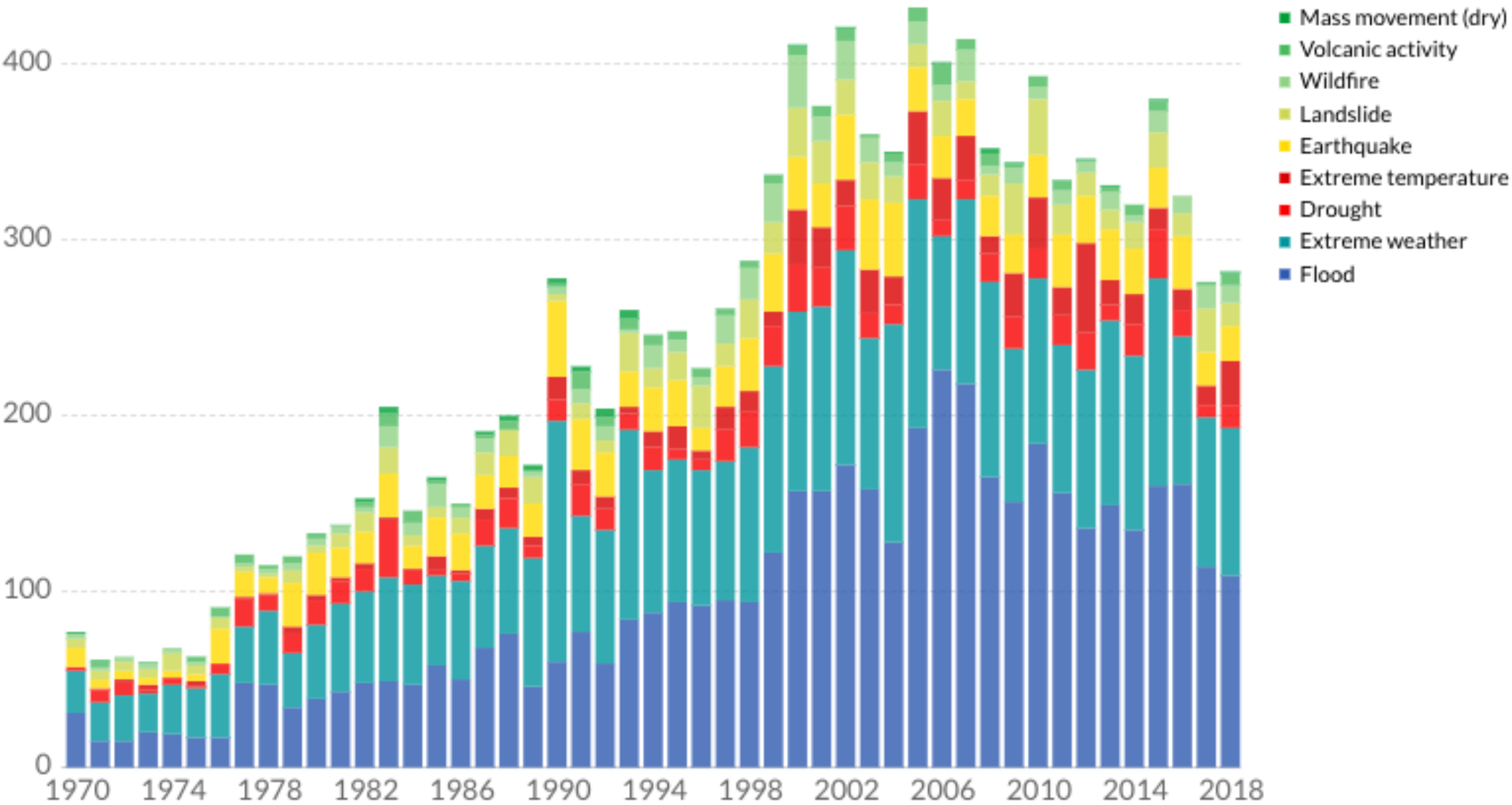
**PAHO**



- Extreme weather events and health
- Early Warning systems
- PAHO / WHO response

# Global reported natural disasters by type

The annual reported number of natural disasters, categorised by type. This includes both weather and non-weather related disasters.

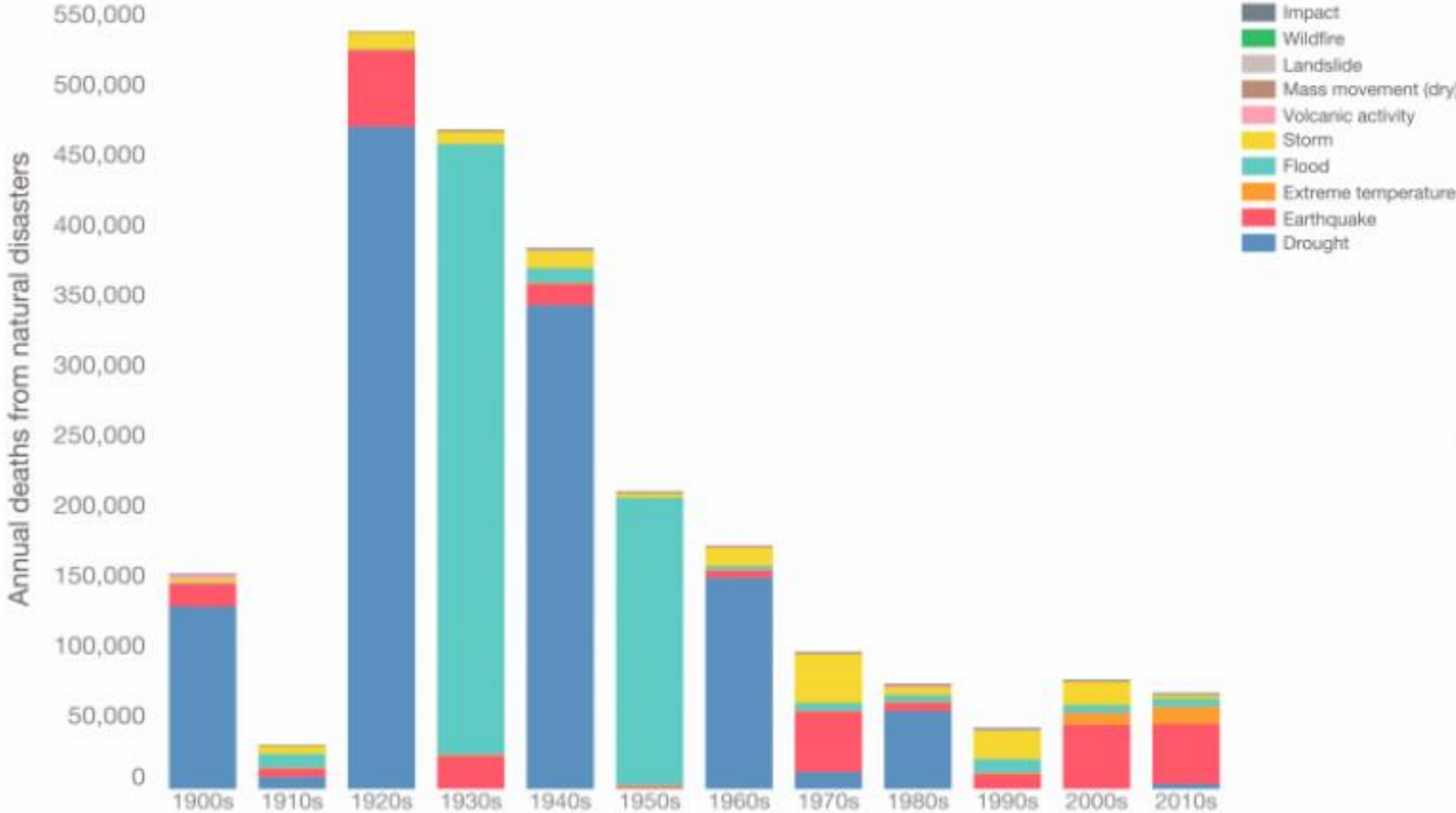


Source: EMDAT (2017): OFDA/CRED International Disaster Database, Université catholique de Louvain - Brussels - Belgium



# Global annual deaths from natural disasters, by decade

Absolute number of global deaths from natural disasters, per year.  
This is given as the annual average per decade (by decade 1900s to 2000s; and then six years from 2010-2015).

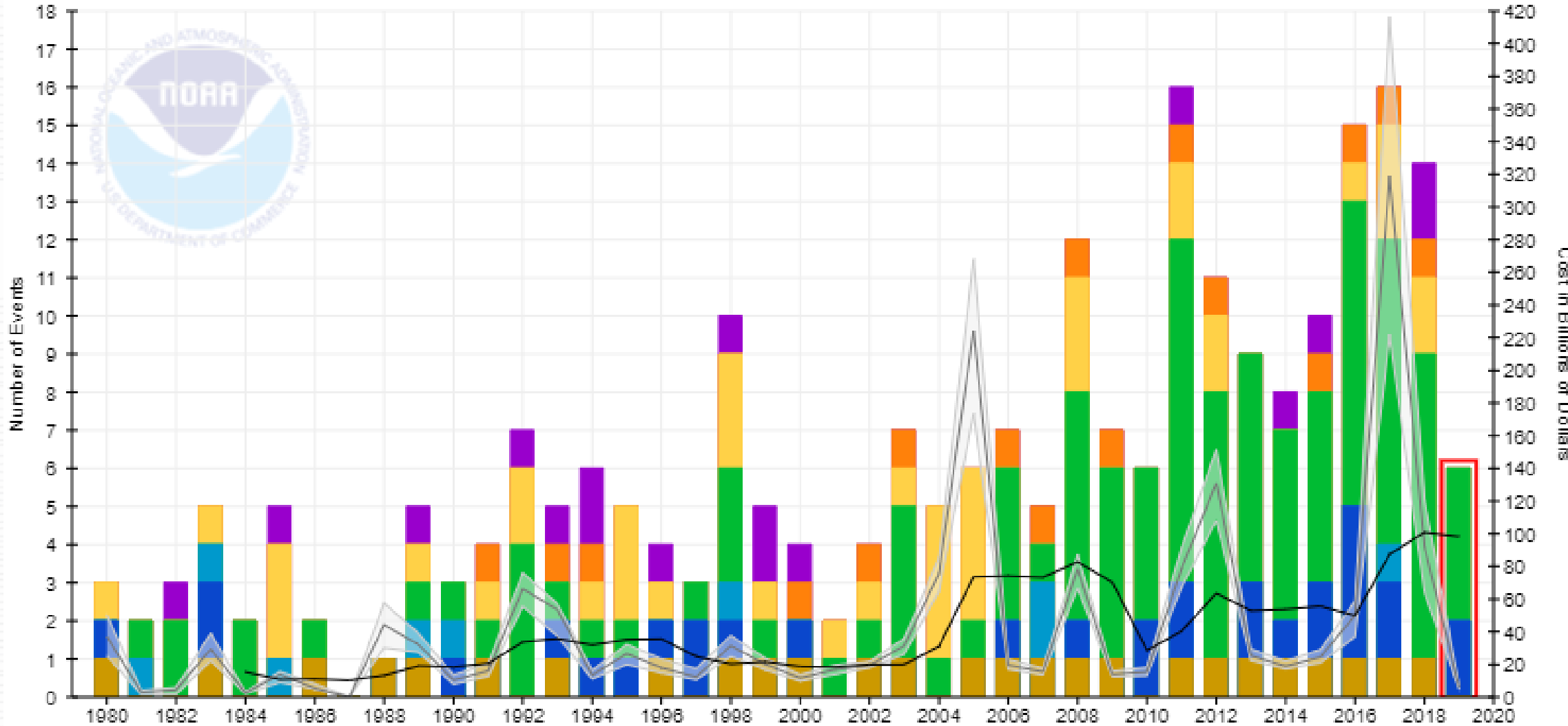


Source: EMDAT (2017); OFDA/CRED International Disaster Database; Université catholique de Louvain - Brussels - Belgium. The data visualization is available at [OurWorldinData.org](http://OurWorldinData.org). There you find research and more visualizations on this topic.

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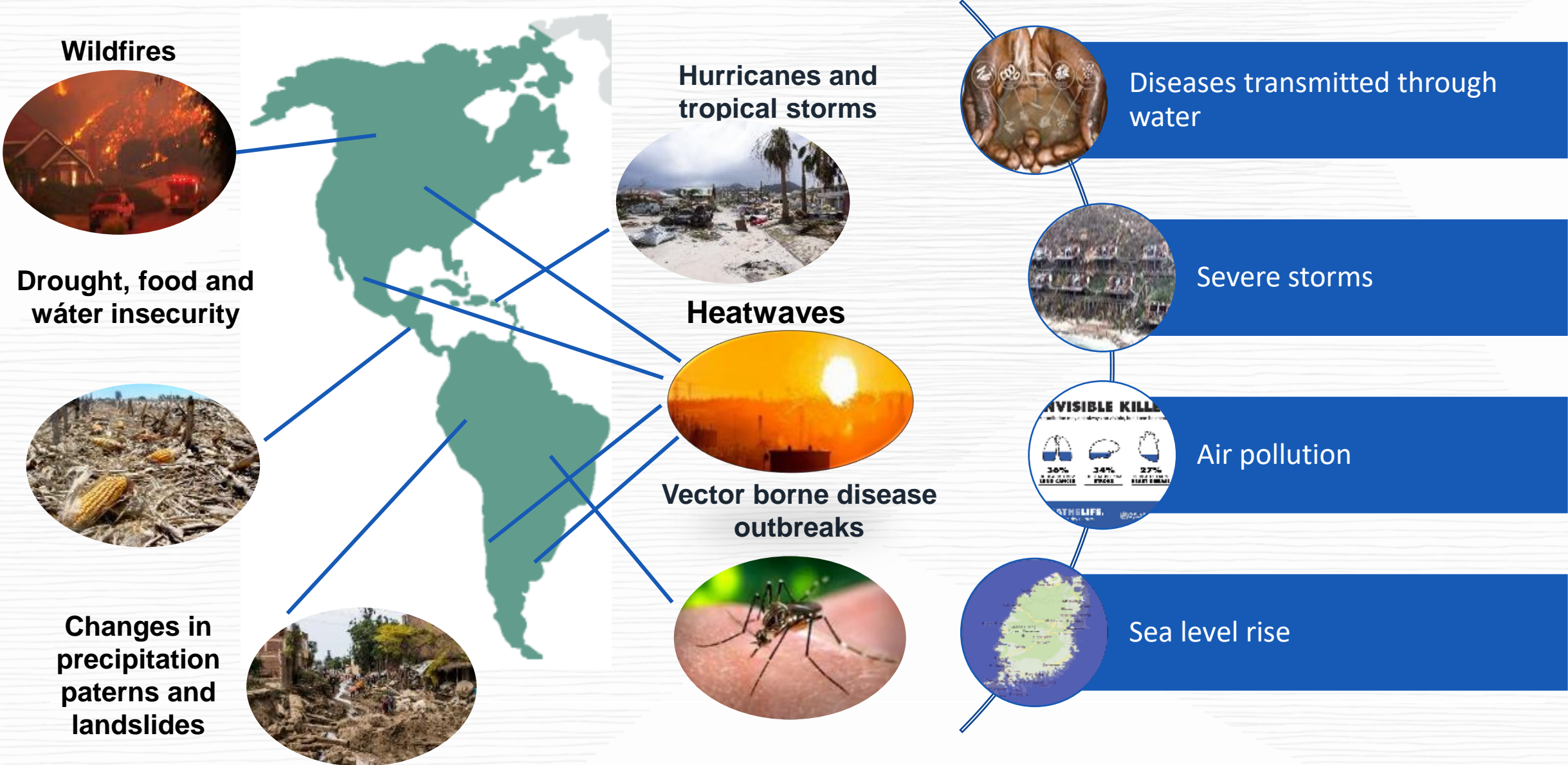
# Billion-Dollar Disaster Event Types by Year (CPI-Adjusted)

- Winter Storm
- Wildfire
- Trop Cycl
- Severe Storm
- Freeze
- Flooding
- Drought
- Cost w/ 95% CI
- 5-Year Mean



Source: NOAA, National Weather Service

# Recent impacts of climate on health in the Americas



# Extreme Weather Events

## Intense precipitation

Peru – april 2017

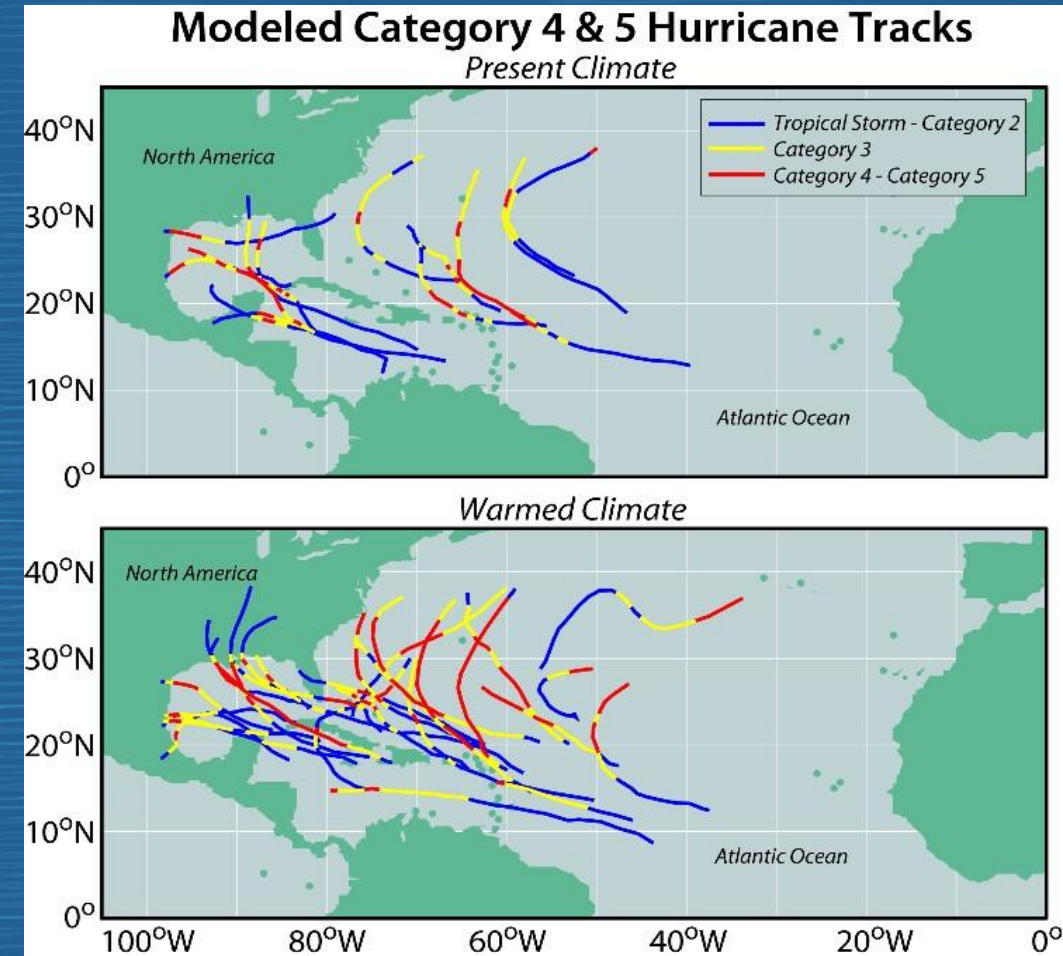
>665,000 persons affected, >100,000 wounded, 79 deaths

>145,000 homes affected (>18,000 totally destroyed), 1,245km of roads & 159 bridges



Colombia (> 300 dead en 2017)

Other affected countries: Ecuador, Brazil,



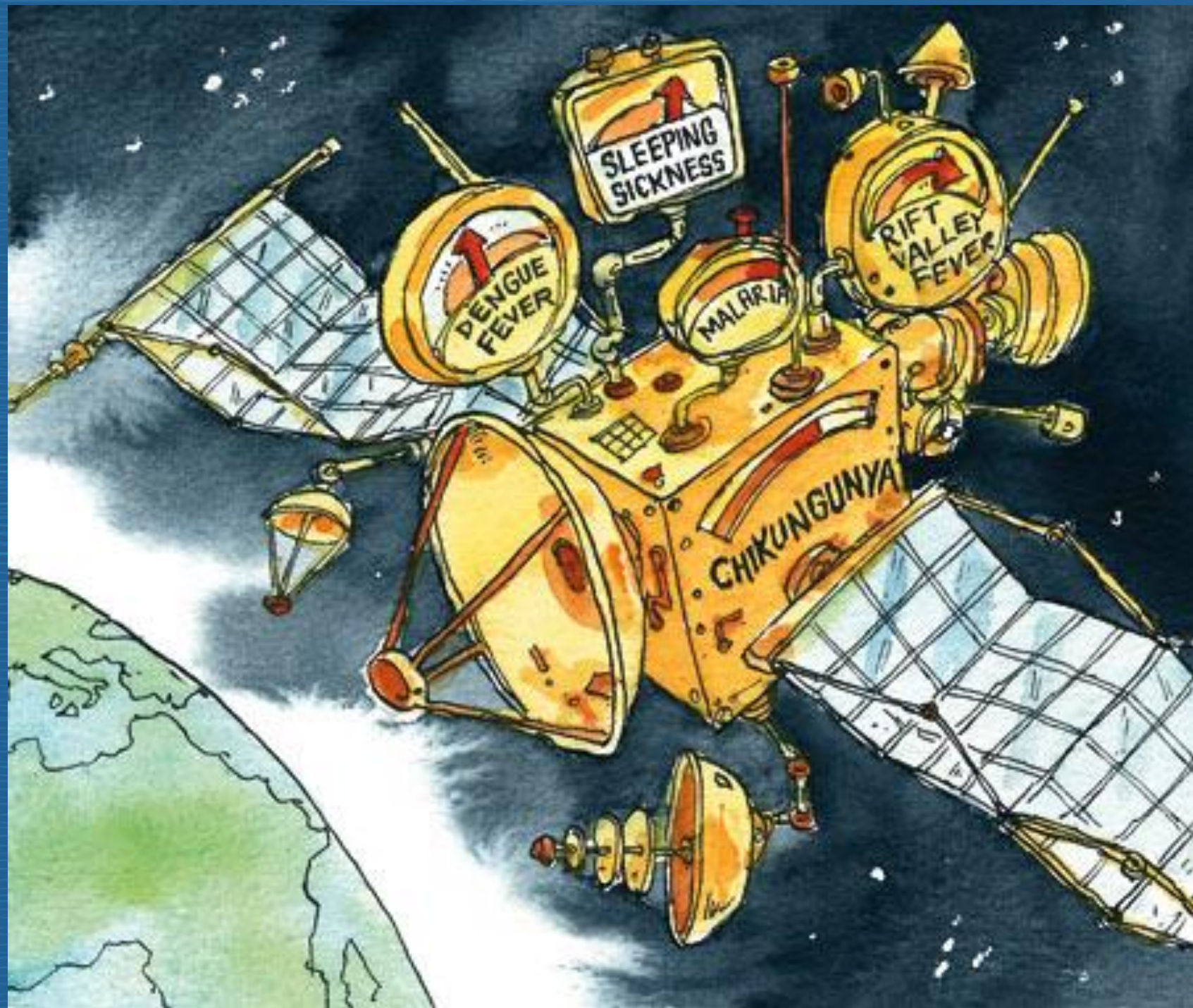
Bender et al 2010. *Science*

Between 2004 & 2012 the region was affected by 62 tropical storms. By 2050, it is projected that these will increase in intensity and frequency.

PAHO/WHO  
Maria 2017



# From global observations to local interventions





- Extreme weather events and health
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# Early warning systems

Early warning systems are means by which people receive **relevant** and **timely** information in a systematic way prior to an extreme weather event in order to make informed decisions and take action.

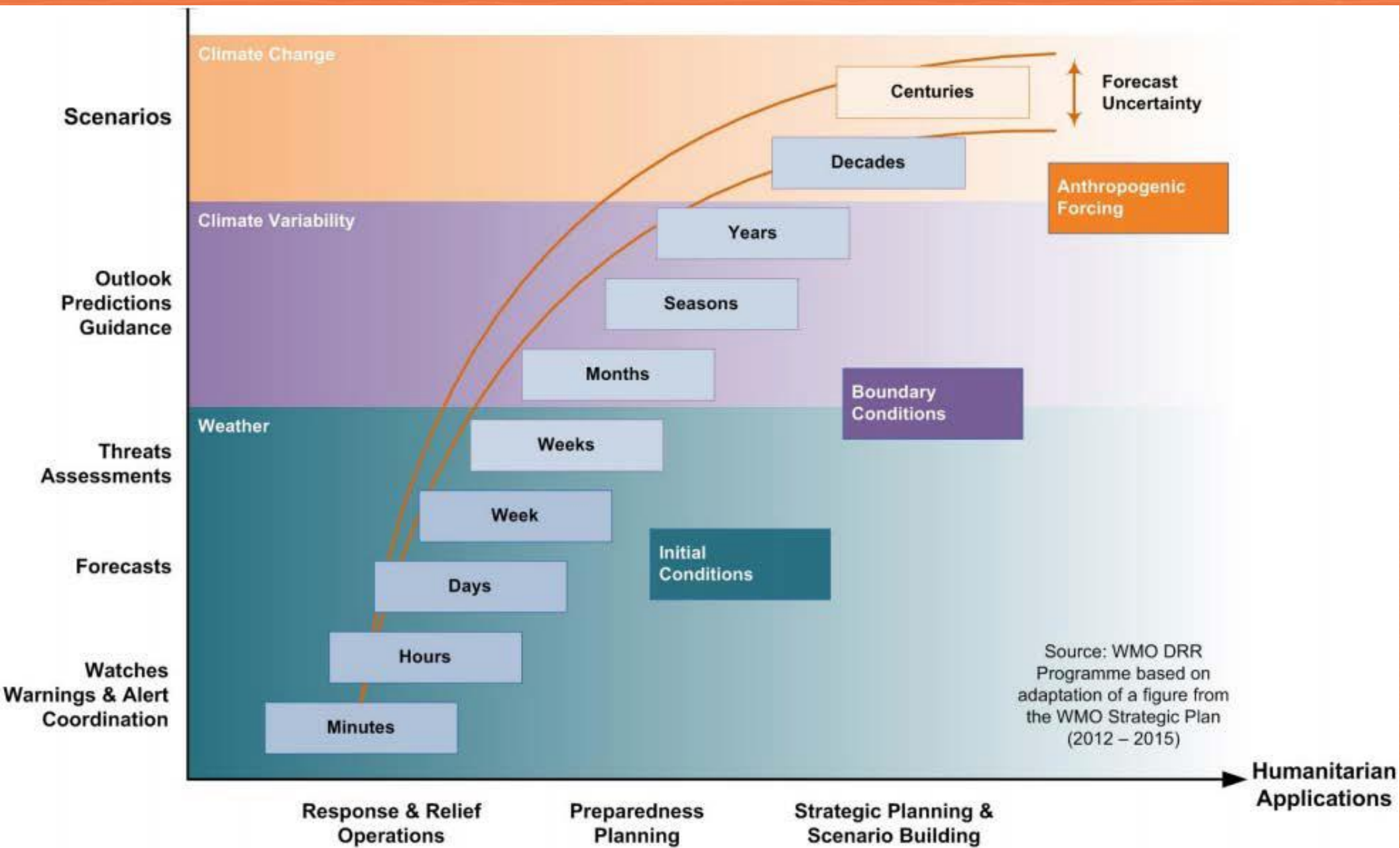
Early warning systems are timely surveillance systems that collect information on epidemic-prone diseases in order to trigger prompt public health interventions.

They rely on an in-depth review by epidemiologists of the data coming in. Statistics should be used to extract significant changes drowned in routine tables of weekly data.



<https://www.who.int/csr/labepidemiology/projects/earlywarnsystem/en/>

<https://www.preparecenter.org/topics/early-warning-systems>



Source: <https://www.newsecuritybeat.org/2015/10/climate->

data-critical-fragile-conflict-affected-states-heres/

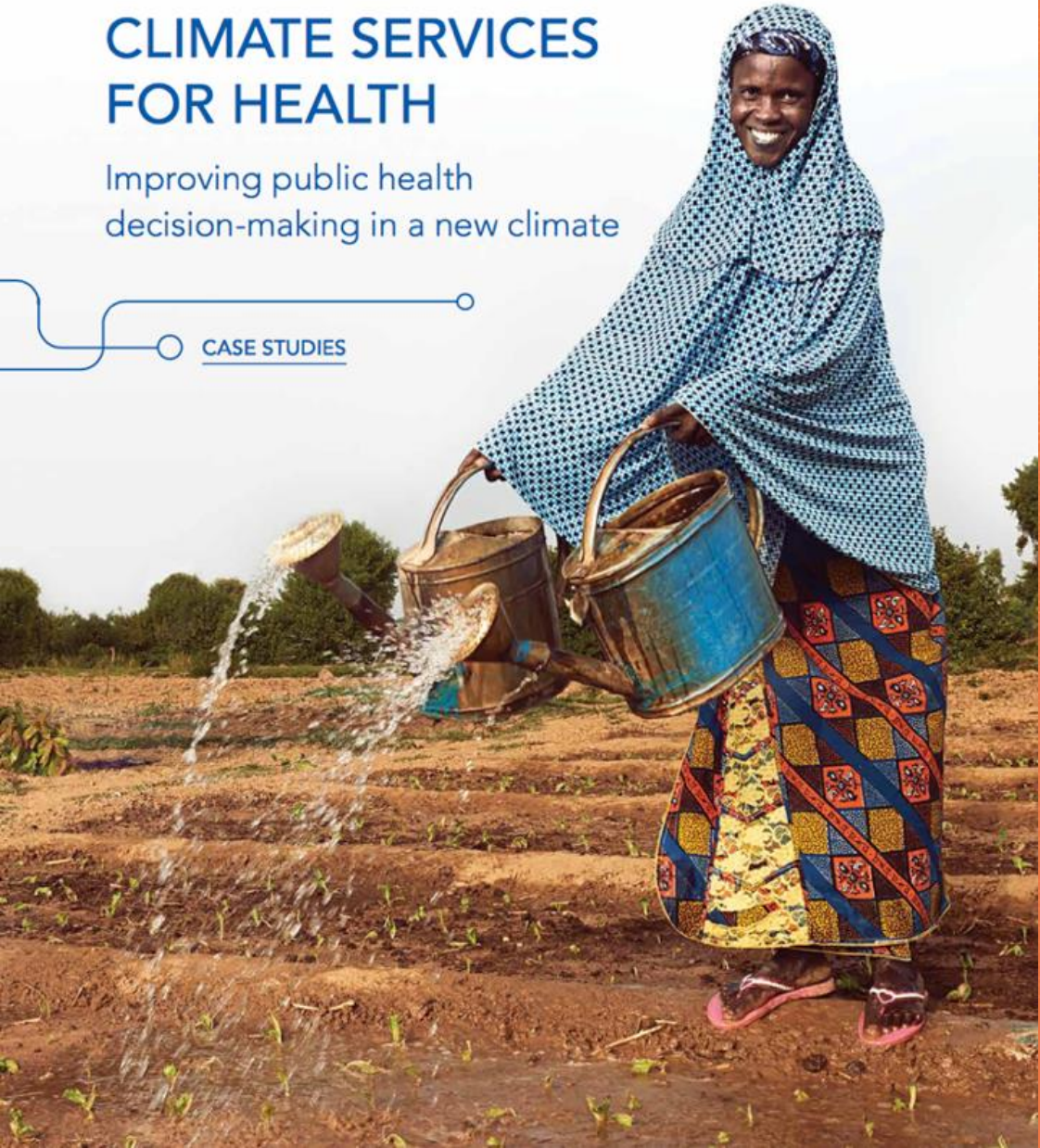


**PAHO**

# CLIMATE SERVICES FOR HEALTH

Improving public health  
decision-making in a new climate

CASE STUDIES



PAHO/WHO

# Climate services for health

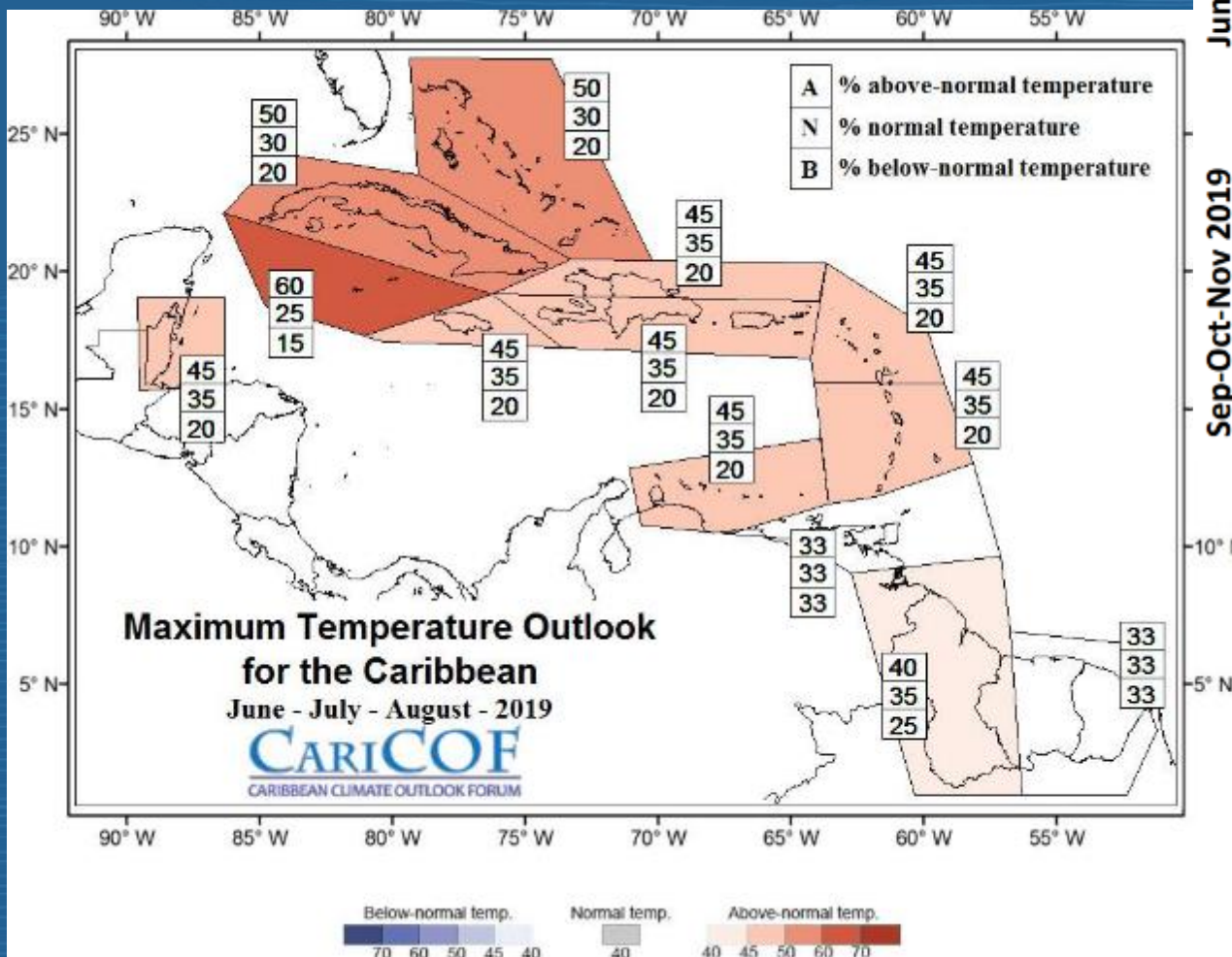
- Transform climate information into relevant, usable decision-support tools
- Manage the risks of environmental change

## Key components

- Partnership, Research, Product development & delivery, Evaluation, Capacity building
- Co-developed by health and climate professionals

# Caribbean Outlook Forum

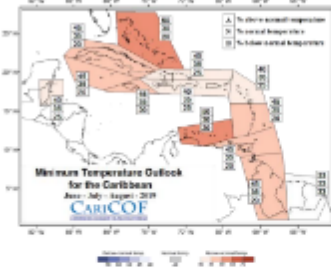
PAHO/WHO



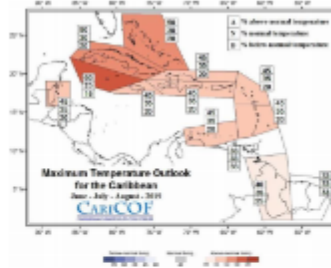
## How hot will the next three to six months be?

Jun-Jul-Aug 2019

Night time

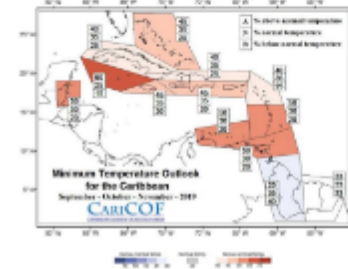


Day time

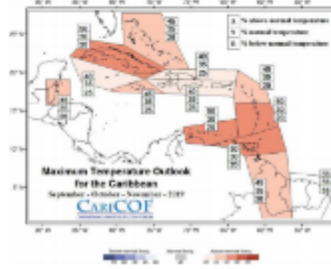


Sep-Oct-Nov 2019

Milder Usual Hotter



Milder Usual Hotter



### FORECAST:

1. Warmer than usual conditions are forecast for most areas between June and November.
2. Night-time temperatures between September and November may turn out slightly cooler than usual in Guyana.

### IMPLICATIONS:

- Heat stress in the vulnerable population & small livestock from
  - July to September in the Bahamas and Greater Antilles;
  - August to October in the Lesser Antilles;
  - September to November in the Guianas.
- Cooling need until October will potentially be higher than the previous two years.



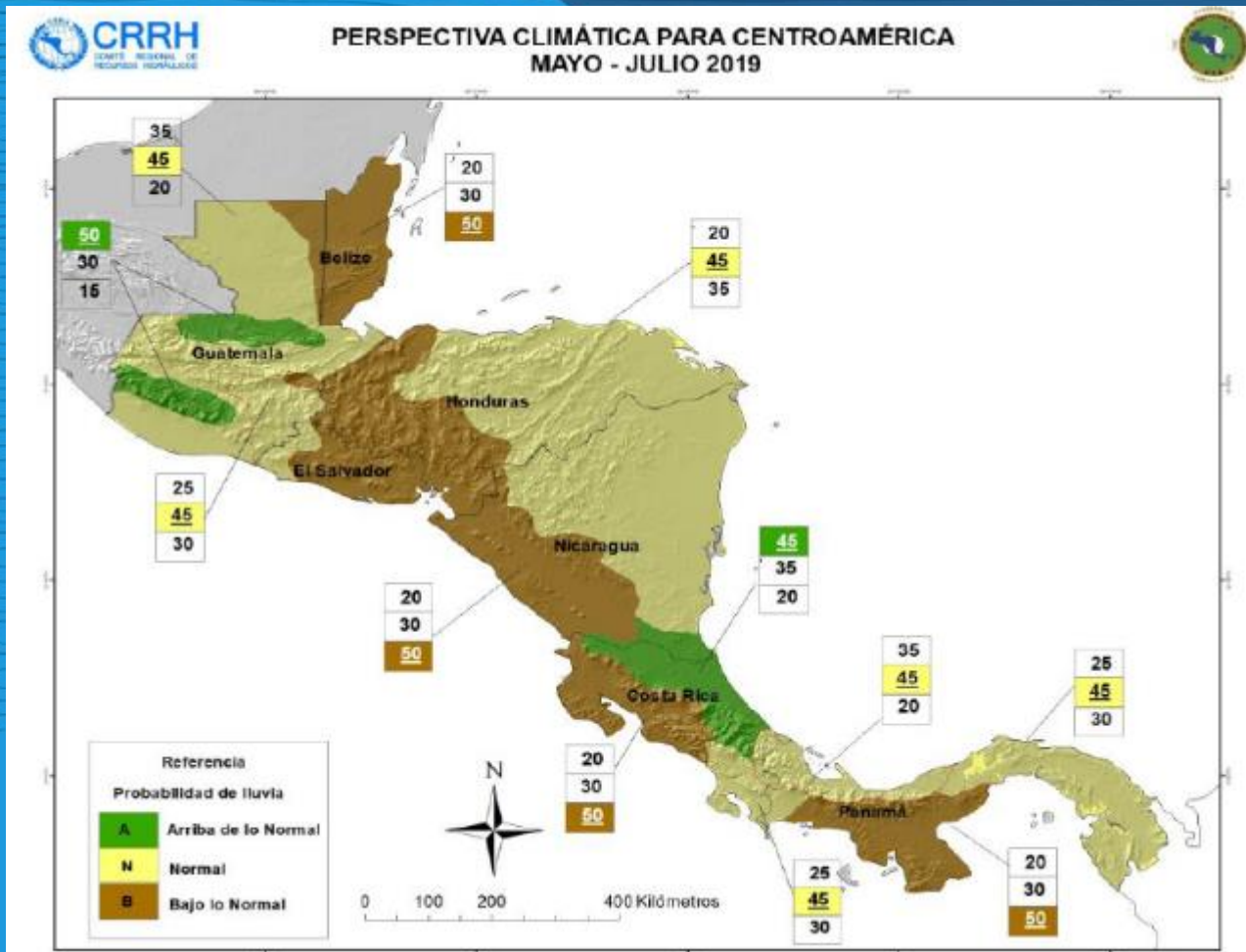
## Caribbean Health Climatic Bulletin

Vol 3 | Issue 1  
March 2019

This Bulletin is a joint effort between the Caribbean Public Health Agency (CARPHA), the Pan American/World Health Organization (PAHO/WHO) and the Caribbean Institute for Meteorology and Hydrology (CIMH). It aims to help health professionals identify and prepare health interventions for favorable or inclement climate conditions in the Caribbean. The period covered is March to May 2019. It is recommended that health stakeholders should use the combination of monitoring (November 2018 - January 2019) and forecast (March - May 2019) climate information presented in this Bulletin in tandem with weather forecasts (1-7 days). This suite of information is intended to guide strategic and operational decisions related to health interventions and the management of health care systems.

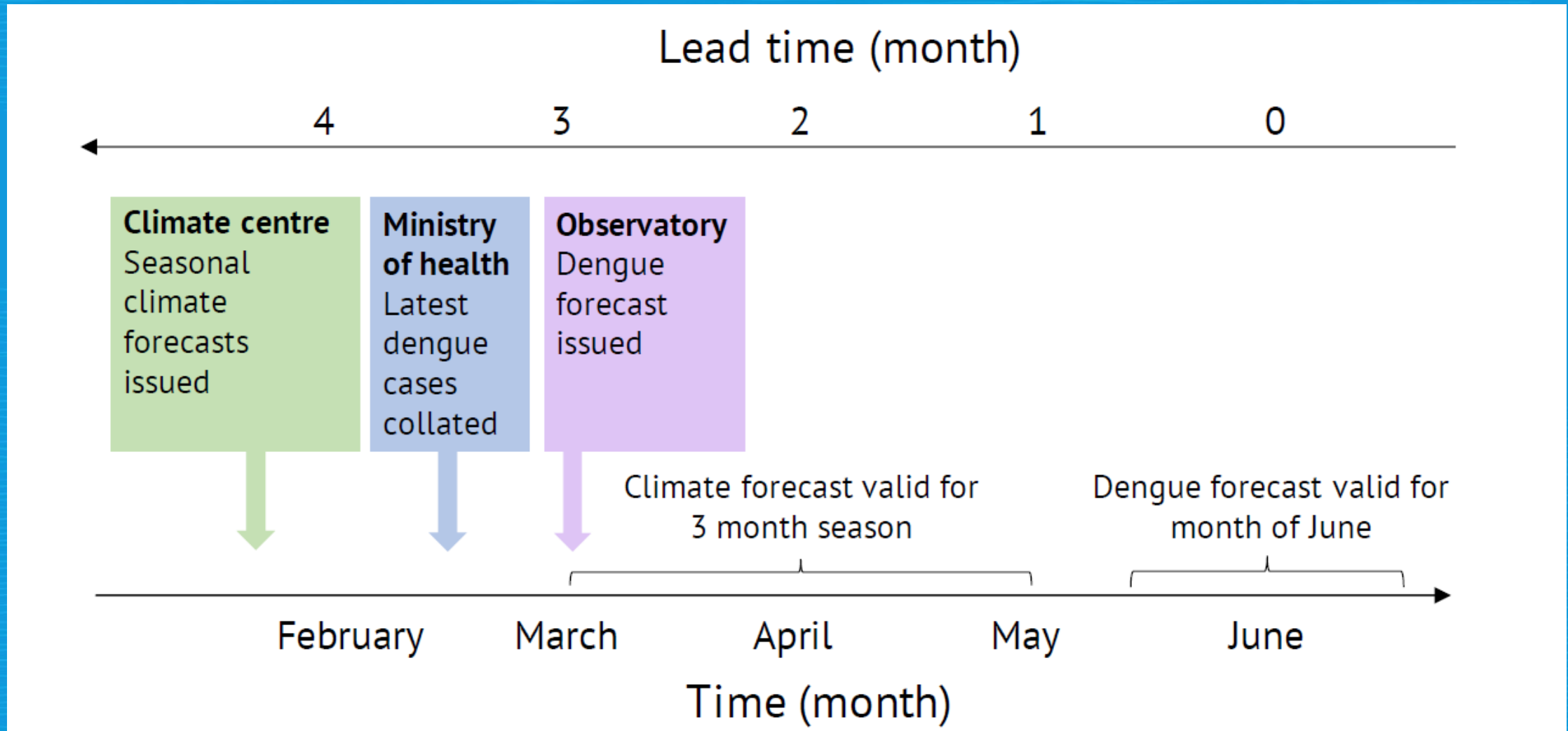
What are the Key Climate Messages for March to May 2019?

# Central American Outlook Forum



- Precipitation
- Temperatures
- Agriculture
- Food security and Health
- Water
- Fisheries and aquaculture

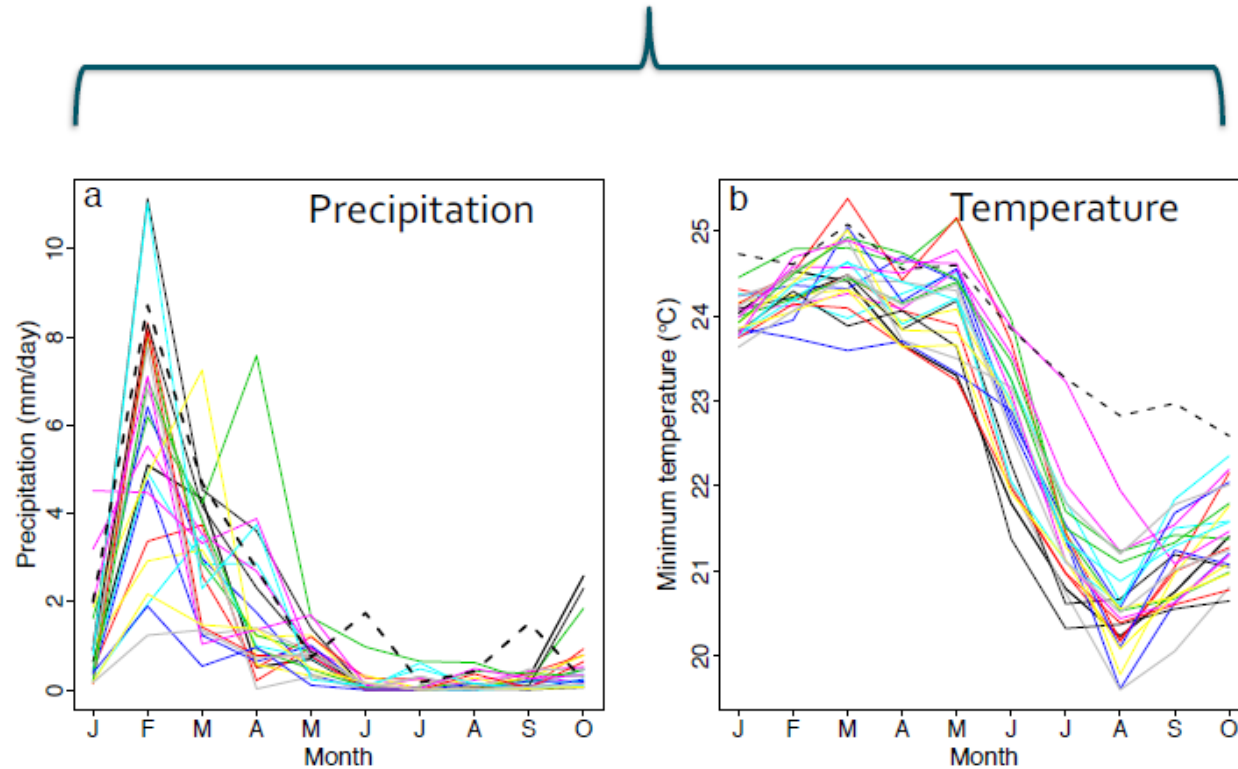
# Early Warning Systems for Dengue



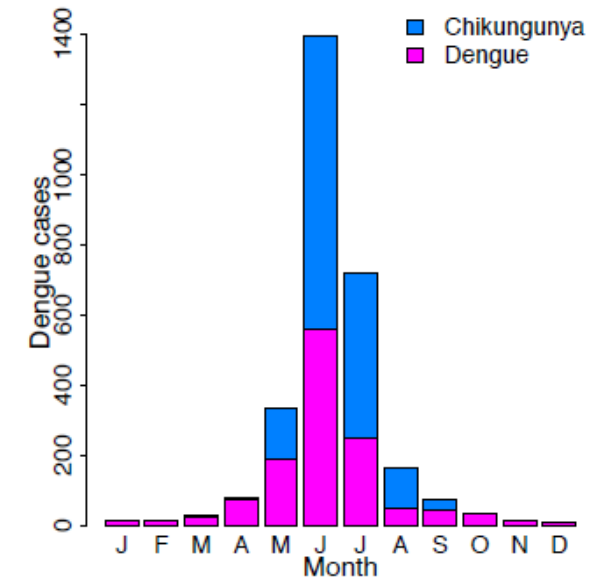
# Sources of predictability

## Timing

## Magnitude



Seasonal climate forecasts

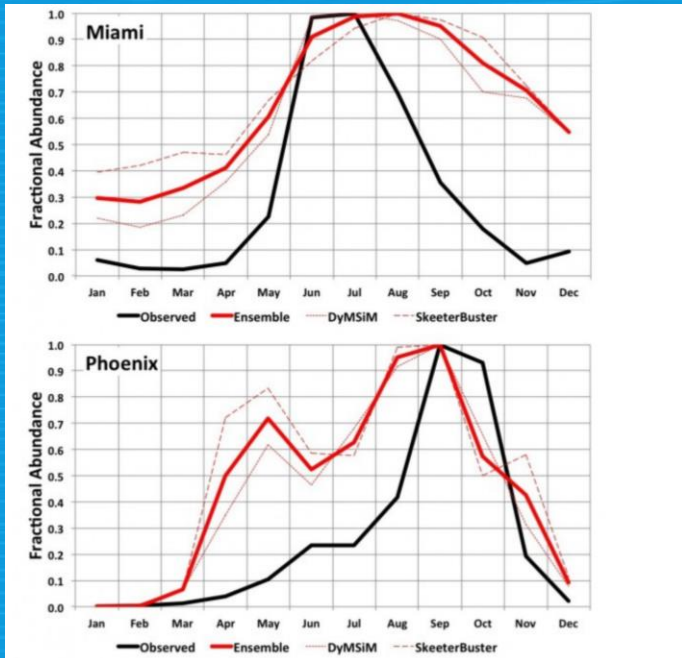


Active surveillance

# Dengue in Barbados

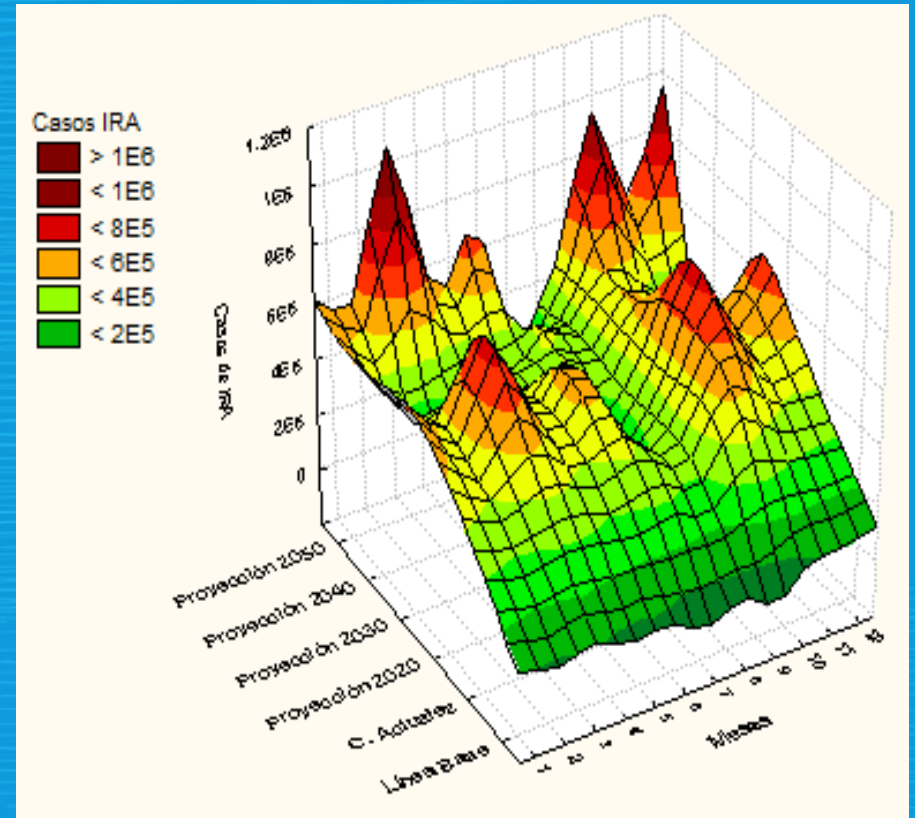
## Findings

- Drought periods followed by warm & wet conditions could provide optimum conditions for imminent outbreaks
- Model predicted months with dengue outbreaks v non-outbreaks in most years, but last 2 years complicated by CHIKV & ZIKV introductions



# Abundance of Aedes aegypti

# Respiratory infections in Cuba





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## Mitigation and Adaptation actions by the health sector



### On reducing emissions:

- Assess the health system's emissions
- Reduce emissions of health-care facilities
- Monitor the hospitals' and health systems' climate footprint
- Identify environmentally friendly suppliers
- Implement green purchasing policies



### On strengthening health system resilience:

- Develop vulnerability and adaptation assessment plans
- Map climate risks and vulnerable populations
- Prepare Early Warning Systems
- Implement emergency preparedness and disaster risk management plans



### On Training:

- Train health personnel about the linkages between climate change and health
- Engage communities and prepare health literacy and health promotion programs
- Provide access to climate and health data to better inform scientists and the population

## Intersectoral actions: co-benefits

Opportunities to improve health and reduce GHG emissions



### On energy:

- Health need to be included in energy projects and policies
- Invest in clean energy and decarbonize the healthcare supply chain
- Advocate a rapid phase out of coal



### On agriculture:

- Health need to be included in food and agricultural policies
- Follow and promote WHO healthy diets guidelines
- Promote agro-ecological and agroforestry systems



### On transportation:

- Include health in transportation policies
- Improve public transportation, city planning, and infrastructures for walking and cycling.
- Measure city planning through a set of environmental and health indicators



### On financing and governance:

- Develop a strategy to access climate finance in order to ensure financing for the health system to cope climate change risks
- Raise awareness about the linkages between climate change and human health among health organizations and communities
- Develop and update WHO climate and health country profiles
- Support multisectoral collaboration for climate action to maximize co-benefits and accomplish SDGs
- Consider all people while designing the interventions, giving adequate space for the more vulnerable groups to have their needs properly addressed as a priority



**Figure 3**  
Climate change impacts health both directly and indirectly, but is strongly mediated by environmental, social and public health determinants. From references (14, 28-32).

**DIRECT IMPACTS**

- Storm
- Drought
- Flood
- Heatwave
- Temperature Change
- Wildfires

**INDIRECT IMPACTS**

- Water Quality
- Air Quality
- Land Use Change
- Ecological change

**MEDIATING FACTORS**

<p><b>ENVIRONMENTAL</b></p> <ul style="list-style-type: none"> <li>- Geography</li> <li>- Baseline weather</li> <li>- Soil / dust</li> <li>- Vegetation</li> <li>- Baseline air / water quality</li> </ul>	<p><b>SOCIAL</b></p> <ul style="list-style-type: none"> <li>- Loss of habitation</li> <li>- Poverty</li> <li>- Displacement</li> <li>- Conflict</li> <li>- Age and gender</li> </ul>	<p><b>RESILIENCY</b></p> <ul style="list-style-type: none"> <li>- Early-warning system</li> <li>- Socioeconomic status</li> <li>- Health and nutrition</li> <li>- Primary health care</li> </ul>
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PAHO/WHO

# WHO COP24 Special Report on Health and Climate Change



**HEALTH IMPACTS**

Mental Illness	Undernutrition	Injuries	Respiratory Disease	Allergies
Cardiovascular Disease	Infectious Diseases	Poisoning	Water-Borne Diseases	Heat Stroke

# CLIMATE RESILIENCE



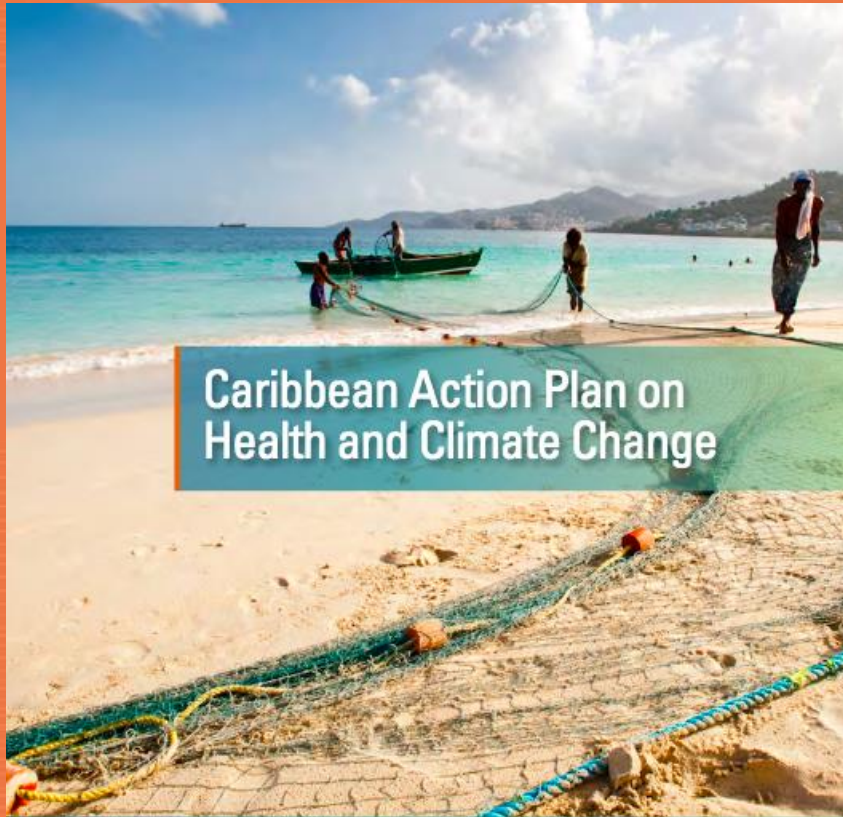
# WHO Operational Framework

Integrated Risk Monitoring and Early Warning



Heatwaves and Actions to be Taken – PAHO 2019

# PAHO Action Plans on Climate and Health



Caribbean Action Plan on Health and Climate Change



**Empowerment** - Supporting health leadership in the Caribbean to engage nationally and internationally

**Evidence** – Understanding the impacts on health, preparing health systems and building the health argument for investments

**Implementation** – Preparedness for climate risks, building climate-resilient health systems and health-promoting mitigation policies

- Implement early warning systems for weather and climate-related diseases and conditions
- Develop and provide climateinformed health services
- Incorporate health in weather and climaterelated disaster preparedness, response and recovery plans

**Resources** – Facilitating access to climate and health finance

# Global Framework for Climate Services



WMO and WHO tackle health impacts of pollution, extreme weather, climate change

WMO/WHO Joint Office



THANK  
YOU!

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