



THE OFFICE OF THE
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Building Resilience to Biosecurity Threats in the Caribbean

August 2, 2018

Walcott Warner Theatre, Errol Barrow Centre for Creative Imagination
The UWI, Cave Hill Campus, Barbados



Climate Change Risks and Biosecurity Implications for the Caribbean

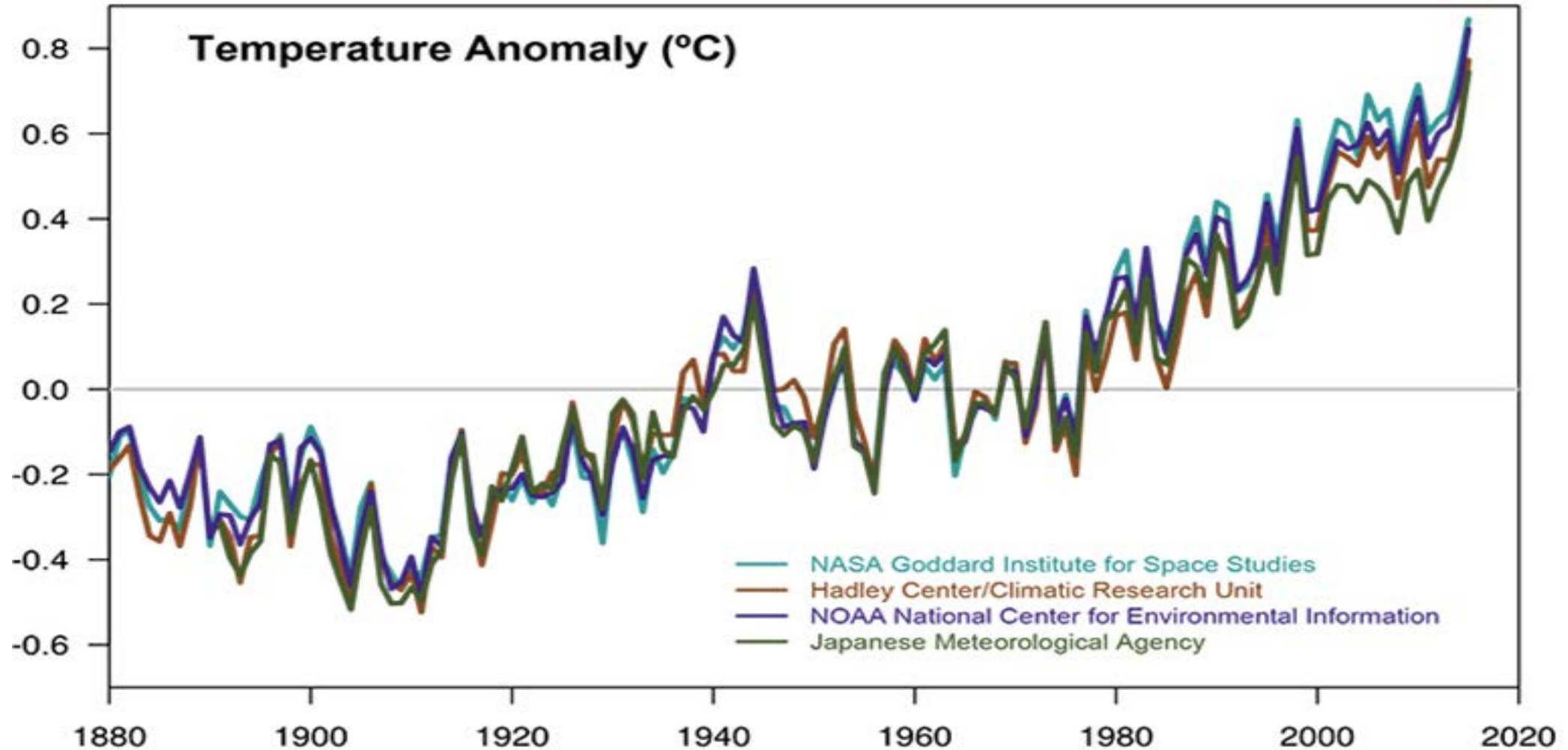
Dr Leslie Rollock

Global Warming

The world has been warming up and at a noticeably more rapid pace over the past 50 years:

- Global average temperature increased 0.17°C /decade since 1970
- Rate of rise over the period 1880-2015 was 0.07°C /decade
- Rate of rise land temperature higher - 0.11°C /decade, compared to ocean temperature rise of 0.07°C
- The first 16 years of the twenty-first century rank among the 17 warmest years on record.

Average Global Surface Temperatures



Global Warming via Green House Gases

The bulk (5/6) of this excess warming has been attributed to human activities:

- Burning fossil fuels for energy increases heat trapping carbon dioxide concentrations in the atmosphere
- Rice agriculture, ruminant rearing, oil exploration has increased methane levels
- Production of nitrous oxide and manmade halocarbons

Climate Change

Manifested as changed weather phenomena consistent enough to be termed climate change:

- Increasing land and sea temperatures
- Rising sea levels
- Increased frequency of extreme weather events

Projected Effects of Climate Change

- Increased frequency of milder winters in temperate climates, glacier melts
- Increased frequency of heatwaves, droughts, forest fires
- Increased precipitation when it rains – flooding
- Effects of sea level rise

Projections of Climate Change Impacts

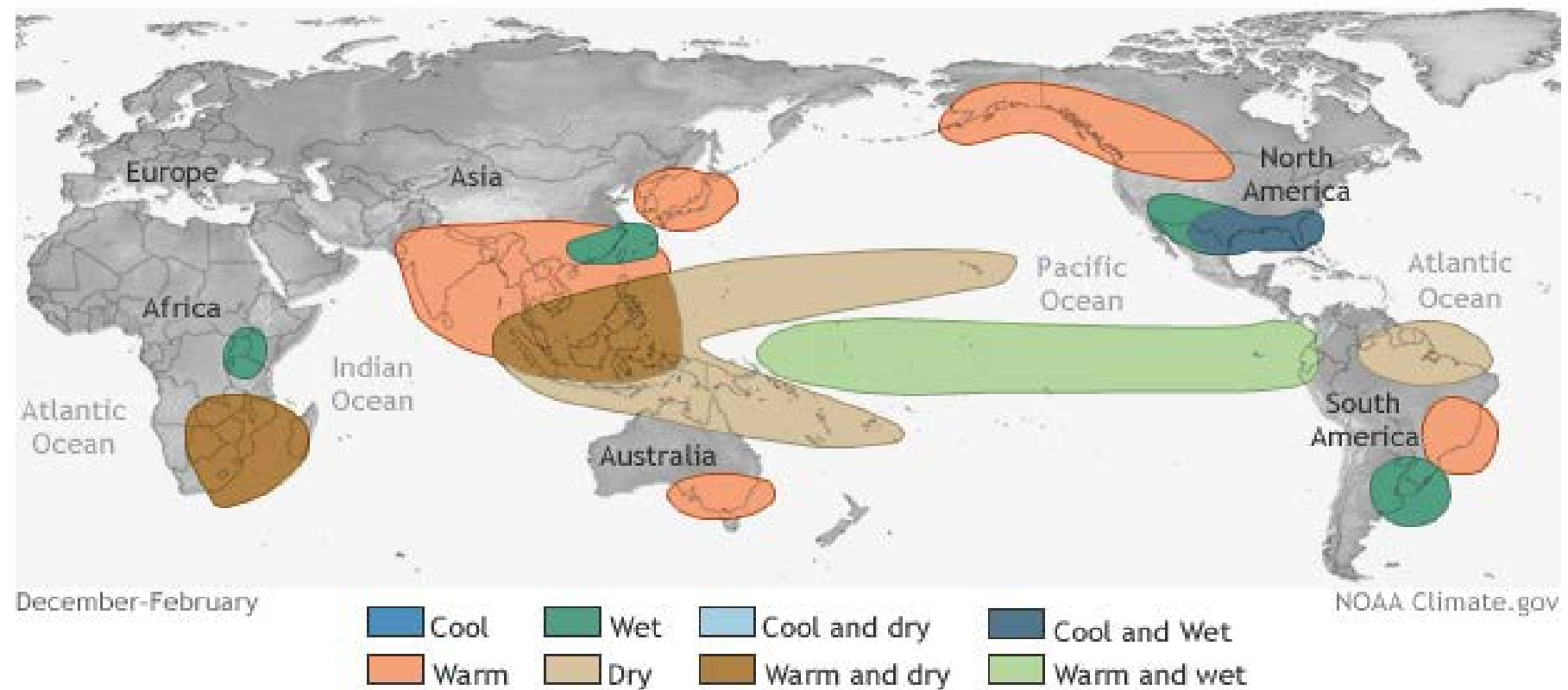
- Estimated changes in land, sea temperatures under conditions of unmitigated carbon dioxide concentrations and some mitigation
- Modelling of regional weather impacts and ecosystem changes
- Resultant possibilities in rainfall levels, insect distributions

El Nino Southern Oscillation

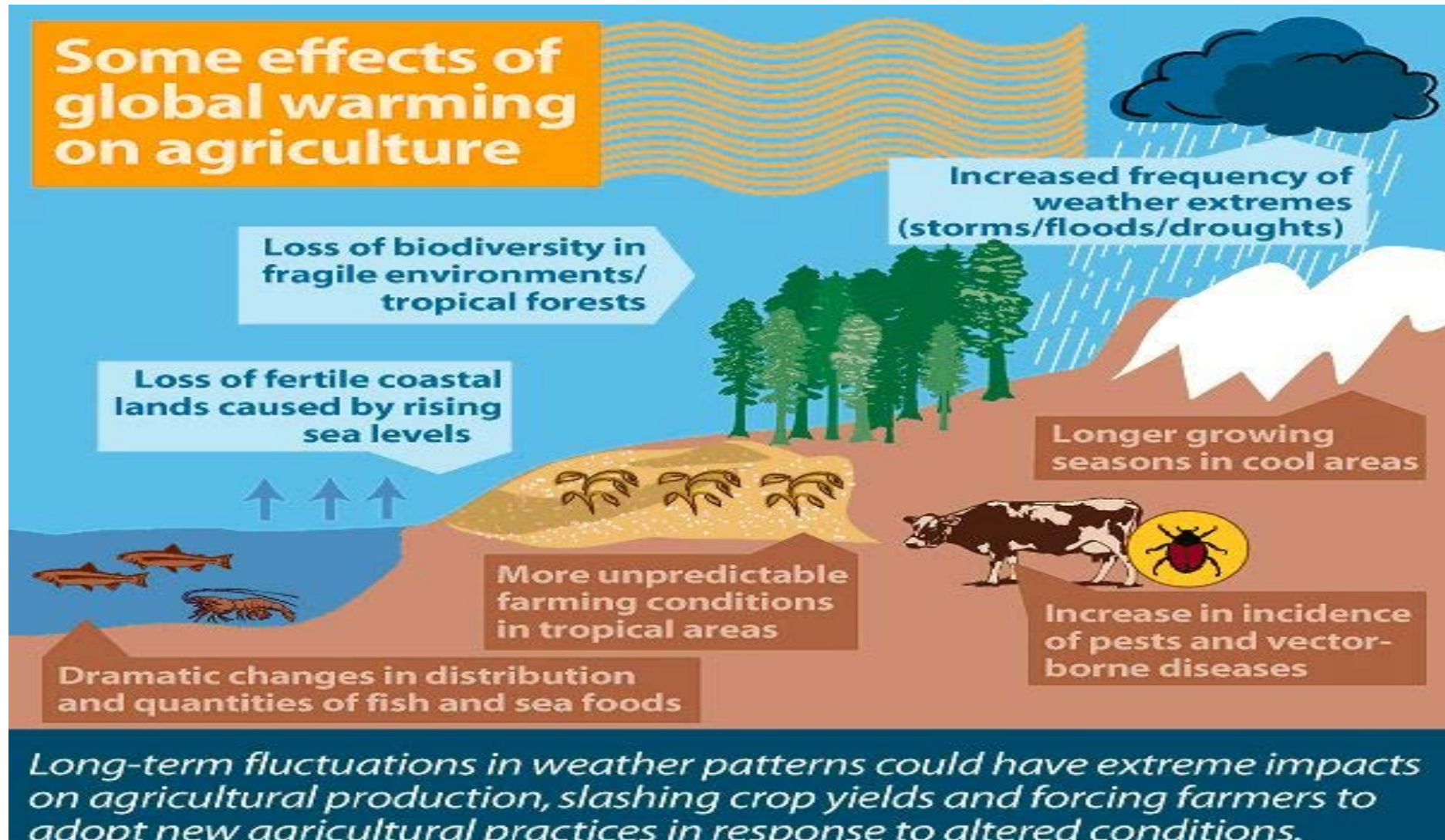
- Large scale variation in atmospheric and ocean circulation
- Occurring every two to seven years
- Warming of the ocean surface associated with weakened easterly winds in the central and eastern tropical pacific
- Associated with drought in the western Pacific, heavy rainfall in the usually dry eastern Pacific and predictable relative wetter and dryer areas across the US and other land masses

El Nino Global Impacts

EL NIÑO WINTER IMPACTS



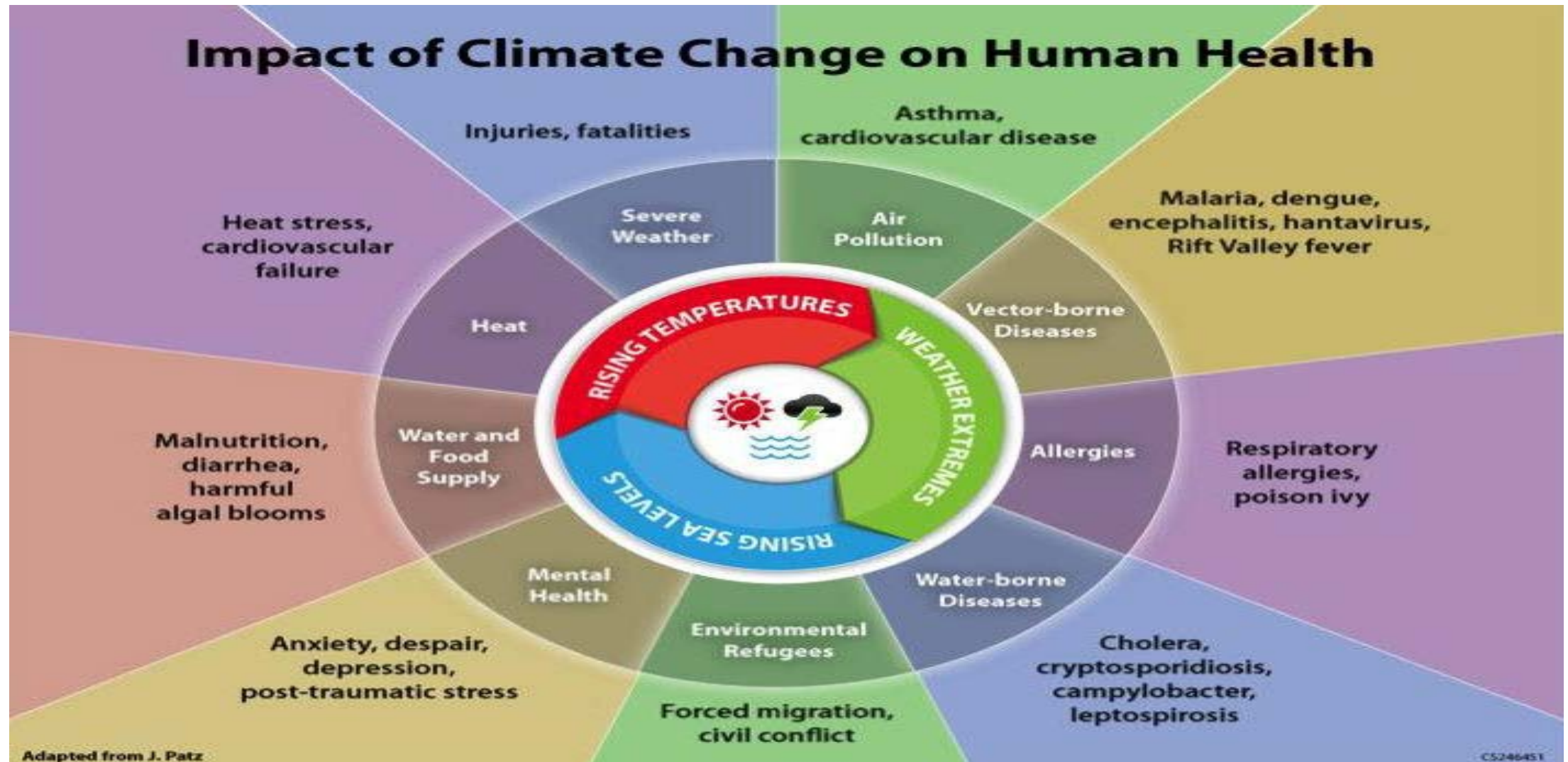
Possible Effects of Global Warming on Agriculture



Possible effects on Agriculture

- Although there is positive possibility of longer growing times in temperate countries and increased yields
- Also the possibility of multiple other negative events that overall projections point to decreased global food production, increased food insecurity and malnutrition

Possible Health Effects of Climate Change



Global Responses

As a result of the projected net negative global impact of climate change:

- IPCC in existence since 1988 collating evidence, assembling partners
- Adoption of UN Framework Convention on Climate Change in 1992 to stabilize greenhouse gas concentrations in the atmosphere to prevent dangerous human interference with the climate system
- Adoption Kyoto Protocol 1997 with targets to reduce emissions by 2012, not attained
- Paris Agreement 2015 to limit global temperature rise below 2°C and as close as possible to 1.5°C

Containing Global Warming

- Many countries, including those in the Caribbean, have signed the Paris Agreement and voluntarily committed to country actions to contribute to reduced emissions
- They are also encouraged to develop and implement adaptation plans to cope with the effects of climate change
- America, one of the largest contributors to greenhouse gas emissions, has applied to withdraw from the Paris Agreement
- The pledged nationally determined contributions would not have contained the average global temperature rise to 2°C.

Climate Change Risks for the Caribbean

- The features of climate change are current and set to continue for at least the next four decades as the oceans process the current load of greenhouse gases
- Effects of increased land and sea temperatures and sea level rise locally
- Effects of climate change on trade partners

Caribbean Community

- Tropical twenty country grouping of fifteen members and five associate members of which all but three are islands
- Considered developing countries
- Many are net food importers
- Many economies dependent on tourism with considerable coastal investments, high water use
- High population levels of non-communicable diseases (NCDs)

Climate Change related Issues for the Caribbean

- Ensuring water quality and quantity
- Ensuring food security and safety
- Addressing zoonoses (animal source diseases)
- Addressing temperature stress to humans
- Ensuring energy needs for development while meeting NDCs
- Managing extreme events

Addressing Climate Change Risks

What can be done?

- To modify events;
- To reduce vulnerabilities;
- To recover faster from events

Impacts on Water Quality and Quantity

- Decreased rainfall to replenish water sources
- Less efficient water consumption by commercial and domestic customers
- Salt water intrusion with sea level rise
- Contamination of ground water stores by run-off with flood events
- Contamination or inadequate sterilization of individual water storage solutions

Ensuring Water Quality and Quantity

- Water quality monitoring and remediation system
- Leak detection and management from customers and water providers
- Metering of water provision
- Provision of water by alternatives from ground water e.g. desalination plants using renewable energy sources
- Water use audit and remediation in industry
- Ongoing education of consumers

Impacts on food security and safety

- Inadequate irrigation from drought
- Crop destruction from bush fires, migrating or imported pests
- Loss of agricultural land due sea level rise, floods,
- Decreased fish and seafood stocks due warmed seas, outside commercial competition
- Decreased food availability due demand induced price rises of imports

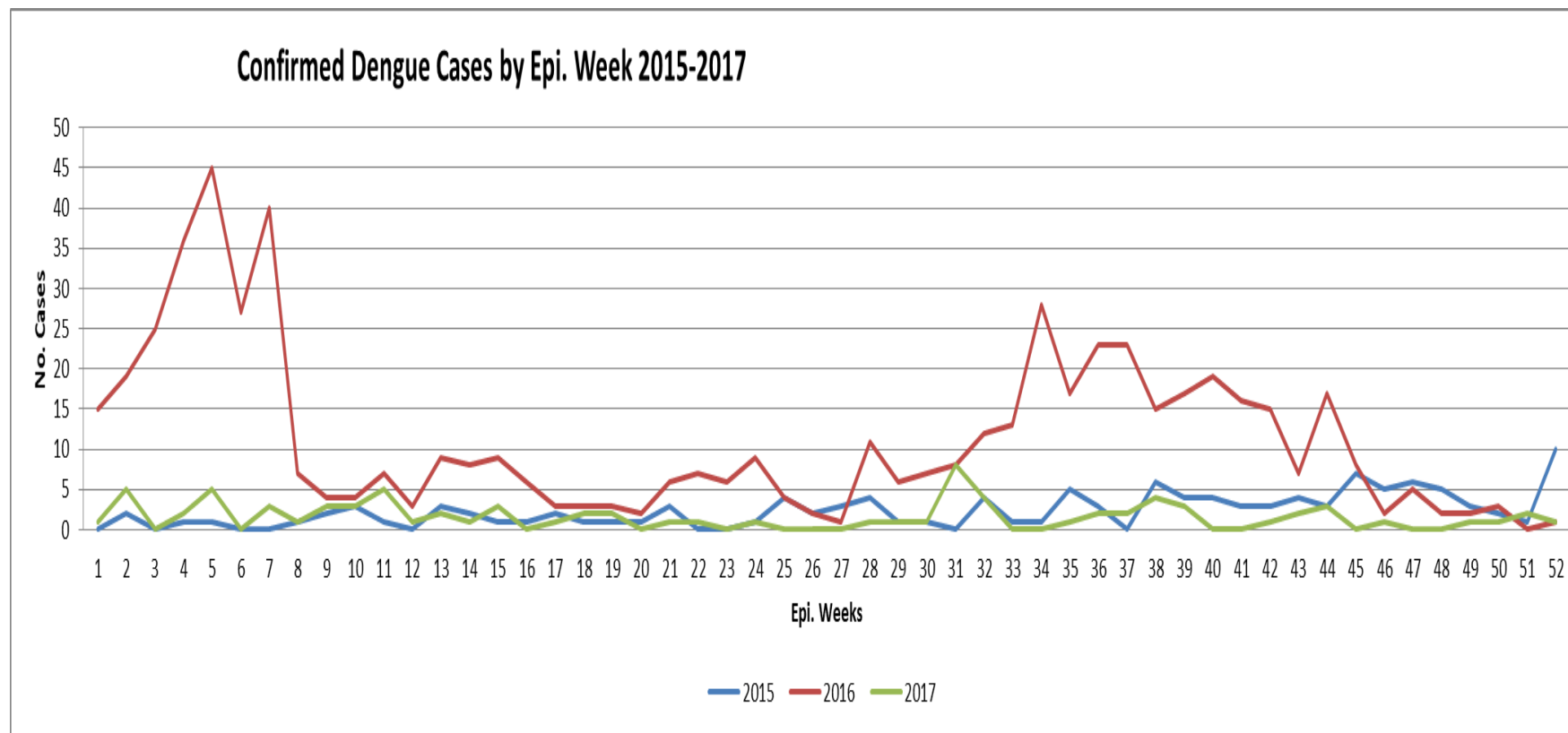
Ensuring food security and safety

- Modify coastal architecture to delay sea encroachment – mangroves, seawalls etc.
- Train farmers, food producers for efficient water use
- Monitor and manage land pollutants into marine ecosystem
- Monitor and consider introduction of fish species quotas for optimal regeneration
- Import substitution where possible
- Public education on food safety

Impacts of Zoonoses

- Rising temperatures may decrease populations of some insect pests
- Pests may be imported with food or people, find suitable habitat
- Changes in rainfall, temperature may support pest multiplication and biting (standing water or water storage)
- Warm seas may increase incidence of bacteria, toxins in shell fish/reef fish
- Mixing of migrating birds with domestic or commercial at farms can spread infections

Confirmed Dengue Cases by Epi-Week 2015/2017



Updated results to EW 52: 82 confirmed cases



Addressing Zoonoses

- Research and determine where pests likely to be imported from via food or tourists
- Enhance surveillance systems for syndromes, organisms, disease vectors
- Educate fishers and public on danger foods
- Educate public on safe water storage
- Enhance farm management practices to reduce cross contamination from wild birds

Impact of temperature stress to humans

- Vulnerable groups- old, young, ill e.g. with complications of NCDs
- Worsening air pollution/ aero allergens
- Negative cardiovascular effects including increased mortality
- Energy costs for cooling buildings including workplaces, health facilities

Addressing temperature stress to humans

- Enhance prevention and management of NCDs
- Retrofit buildings and city spaces to enhance cooling with vegetation, renewable energy
- Educate public on hot weather management

Increased Energy Needs for Development while meeting NDCs

- Clean energy needed for industry- e.g. pressurized irrigation
- Increased cooling needs, energy for alternative potable water production

Ensuring energy needs for development while meeting NDCs

- Invest in renewable energy as part of national adaptation plan

Impact of Extreme Events

- Physical injuries
- Decreases in nutritional status, especially in children
- Increases in respiratory and diarrhoeal illnesses due to crowding of survivors, often with limited shelter or access to potable water
- Negative effects on mental health which may be long lasting in some cases
- Increased risk of water-related and infectious diseases due to disruption of water supply or sewerage systems, population displacement and overcrowding
- Release and dissemination of dangerous chemicals from storage sites and waste disposal sites into flood waters.

Managing Extreme Events

- Develop, test, update national disaster management plans
- Enhance physical integrity and energy provision at health facilities and other critical sites
- Plan for psychological support especially for frontline workers in a disaster
- Map dangerous substances- biological, chemical & radiological and plan for safe storage in event of disaster or evacuation of those at risk

Common Themes

- Intersectoral Adaptation Planning and Implementation
- Surveillance, Monitoring of threats
- Public Education and training

Selected References

- WHO. 2003. Climate change and human health: Risks and Responses. Geneva
- UN Framework Convention on Climate Change. 2018. Adaptation in human settlements: key findings and way forward. Report by the secretariat.
- Campbell J, Taylor M, Stephenson T et al. 2011. Int. J. Climatol. 31: 1866–1878
- Nurse L. 2017. Climate Change Projections for the Caribbean and Implications for Air and Sea Ports. UNCTAD National Workshop Jamaica: “Climate Change Impacts and Adaptation for Coastal Transport Infrastructure in Caribbean SIDS”



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