PROFESSOR JOHN AGARD UNIVERSITY OF THE WEST INDIES & IPCC AR5 WORKING GROUP II SMALL ISLANDS CHAPTER





CLIMATE CHANGE IMPACTS, ADAPTATION AND VULNERABILITY IMPLICATIONS FOR JAMAICA



VULNERABILITY

Almost the entire globe warmed between 1901-2012 Observed change in surface temperature 1901-2012

Surface temperature in the Caribbean warmed by about 0.8 ^oC between 1 1901 and 2012



Land & Ocean Temperature Percentiles Oct 2016 NOAA's National Centers for Environmental Information Data Source: GHCN-M version 3.3.0 & ERSST version 4.0.0

Where are we now?

-Almost every successive month in the Caribbean over the last 2 years has been recorded as the **Record Warmest**



Jamaica Baseline (1986-2005) Annual Precipitation (mm)



JAMAICA MAXIMUM PROJECTED RAINFALL CHANGE BY 2050

(Jamaica 40 GCM median Projected Precipitation Change (%) for RCP 8.5 by the 2050s compared to 1986-2005 Baseline)



Caribbean Sea mean sea level rise is about 2.7 mm per year



Caribbean Sea 22 year mean sea surface height change is about 12 cm between Janurary 1993

- December 2014

Topex/Poseidon Jason-1 and Jason-2 satellite altimetry data



IMPACT

"Loss of livelihoods, coastal settlements, infrastructure, ecosystem services, and economic stability (high confidence)"

Source: IPCC AR5 WG II Ch. 29.6, 29.8



Temperature and pH effects on coral reefs

"Decline and possible loss of coral reef ecosystems in small islands through thermal stress (high confidence)"

Source: IPCC AR5 WGII Ch. 29.3.1.2



Source: IPCC AR5 Fig. CR1

Storm Surge Maps for Jamaica

"The interaction of rising global mean sea level in the 21st century with high-water-level events will threaten low-lying coastal areas (high confidence)"

Source: IPCC AR5 WG2 Ch. 29.4, Table 29-1; WG1 13.5, Table 13.5



ADAPTATION

EFFECT OF CLIMATE CHANGE ON SWEET POTATOES IN JAMAICA



FIRE ON LAND









CLARENDON





YELLOW BELLY

UPLIFTA

GANJA





Varietal differences:

- •Colour (Flesh and skin)
- Texture
- Foliage

Source: CARDI 2010

Source: Dale Rankine, UWI, Mona Campus, Jamaica

Depiction of potential yield changes in Sweet Potatoes in projected future warm and dry climate in Jamaica with and without increased irrigation



FAO AQUACROP MODEL

SOURCE: Dale Rankine, Michael Taylor, Tannecia S. Stephenson, Jane E. Cohen, and Leslie A. Simpson UWI, Mona Campus and CARDI, Jamaica



Results: Analogue Approach (Elevated CO₂ effect)



Warm and Dry: Depiction of yield changes in warm and dry climate

Cool and wet: Yield changes in a cool and wet climate. Conditions more favourable to production.

Beneficial effects of elevated CO₂ tapers off as 2050 is approached

Potential Climate Change impacts

Health

Agriculture

Infrastructure

infrastructure from

Tropical Storms

Coastal Areas

increased intensity of

Watershed Management

Decrease in water supply

Erosion of beaches (loss of coral

reefs). Inundation of coastal wetlands. Costs to protect coastal communities

Natural Areas and Wildlife

Change in forest composition

Shift geographic range of forests Loss of habitat and species

Damage to

Insect vectors and infectious

Crop yields decrease Irrigation demands increase

eg. Zika, Chikungunya, Dengue

diseases increase















Possible Climate Change Adaptation Measures

<u>Health</u>

Prevent mosquito access to standing water

<u>Agriculture</u> Plant more drought tolerant varieties of crops

<u>Infrastructure</u>

Improve and enforce National Building Codes

Watershed Management

Reduce water leakage from underground pipe supply network

<u>Coastal Areas</u>

Replant and restore mangrove wetlands

<u>Forests</u>

Restore degraded forest for Carbon sequestration

THE END