



THE UNIVERSITY OF THE WEST INDIES
AT MONA, JAMAICA

SCIENCE FOR RESILIENCE

**SCIENCE AS CRITICAL TO JAMAICA'S RESILIENCE BUILDING
STRATEGY**



The premise...

*Extreme climate **sensitivity** which translates into **pervasive vulnerability***



Jamaica: small islands surrounded by Caribbean Sea with hilly interior.



All major infrastructure located on limited coastal plains. Narrow economic zone.

Size, location and topography ensures climate influence always present & inescapable.





The premise...

*Extreme climate **sensitivity** which translates into **pervasive vulnerability***



Extreme climate sensitivity i.e. climate is an integral part of everyday existence.



Economy (Agriculture including fisheries & Tourism)
Health and Wellbeing (dengue and asthma) and
Critical livelihood sectors (Water, Energy) bound up with climate

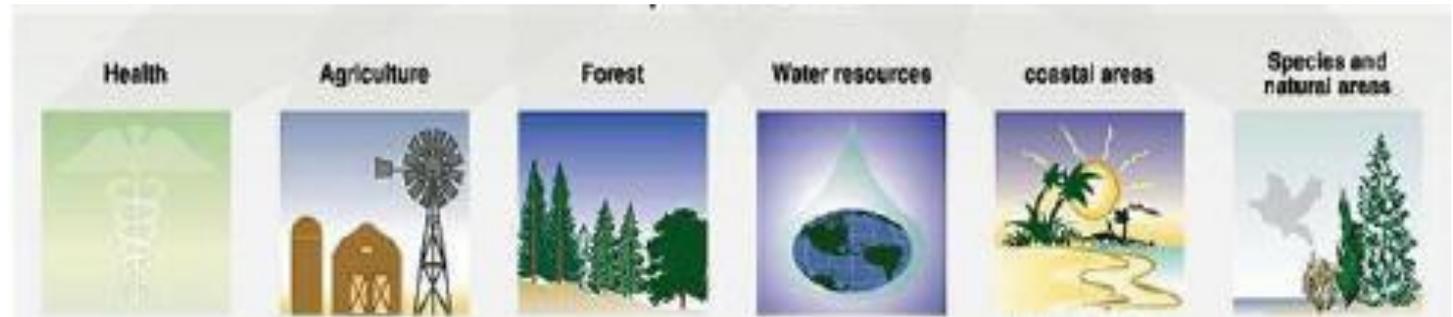




The premise...

*Extreme climate **sensitivity** which translates into **pervasive vulnerability***

Because the **sensitivity** is pervasive (across all sectors/areas of life) so is the **vulnerability**.

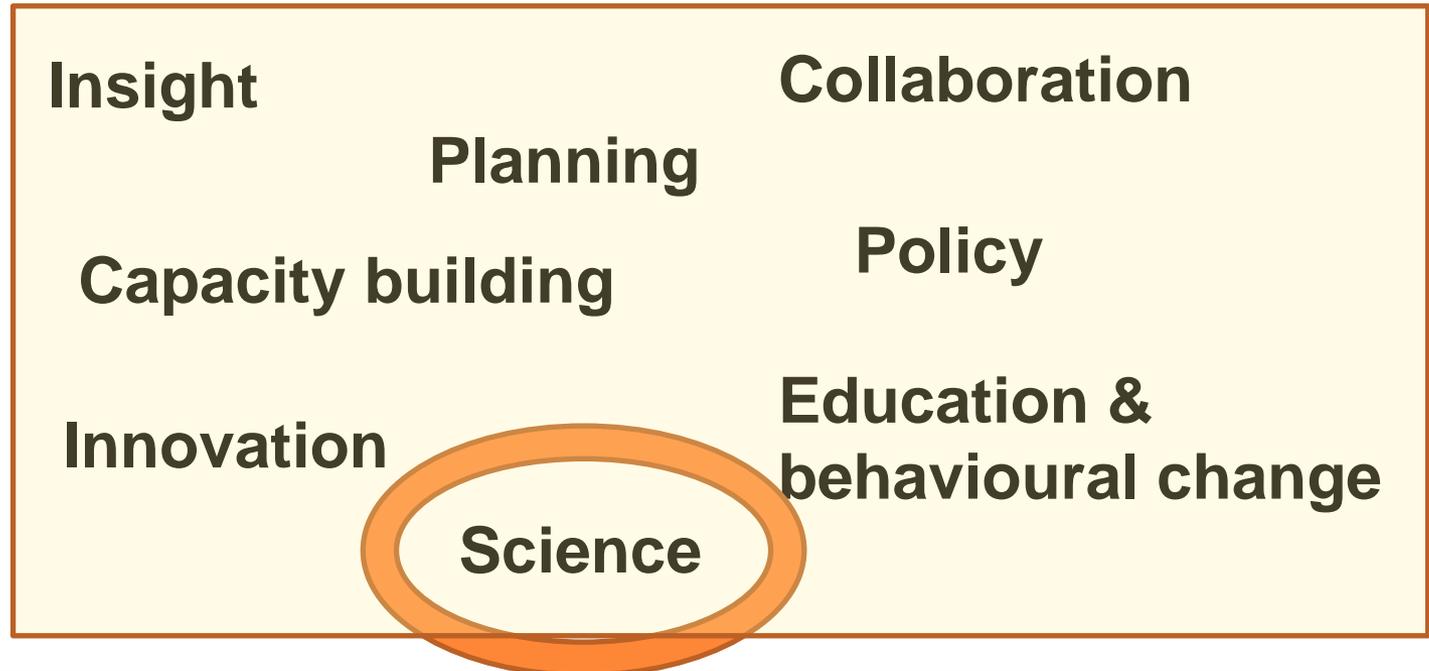




The approach...

The **pervasive** nature of the **vulnerability** demands an approach which is of necessity:

Multi-pronged





The approach...

JAMAICA'S DELIBERATE INCLUSION OF
SCIENCE IN THE QUEST FOR
RESILIENCE IS PREMISED ON:

3 Reasons





Why Science?

Science makes the case for:

1

Why we must act...

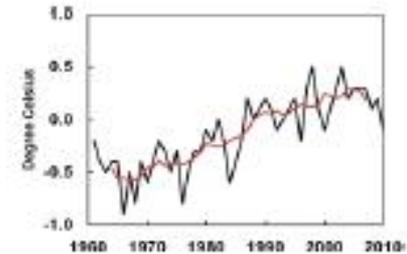
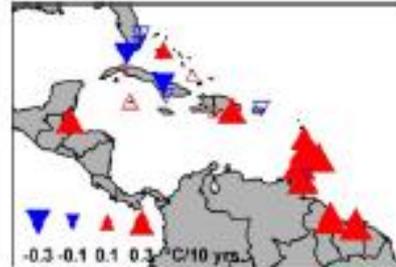
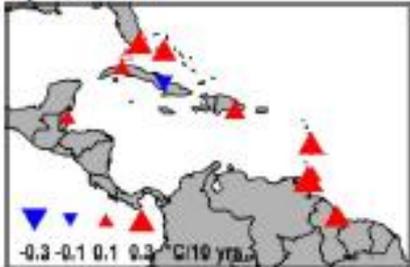




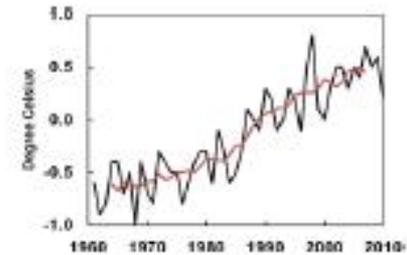
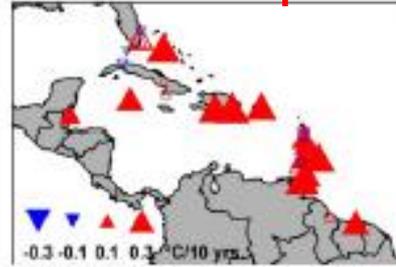
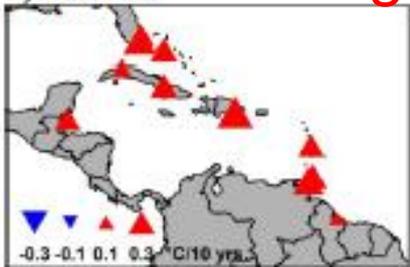
Because Jamaica's temperatures are increasing

Day time temperatures

a) TXmean



b) TNmean



1961-2010

1986-2010

Night time temperatures

Stephenson et al (2014)

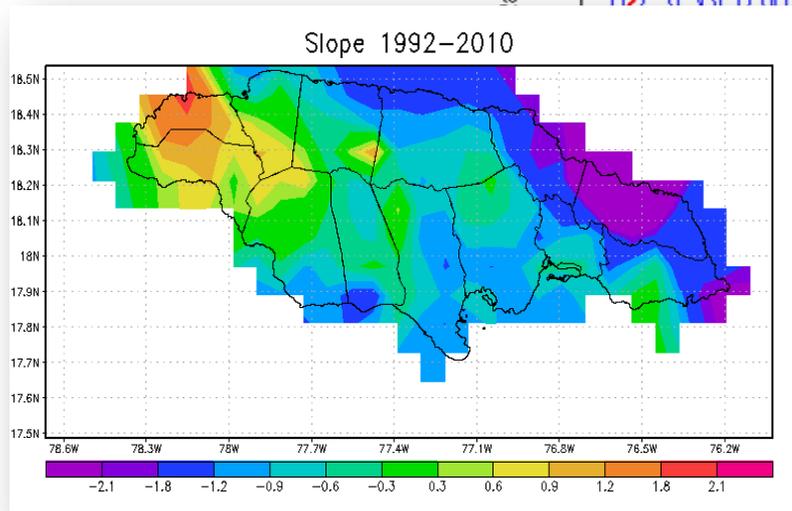
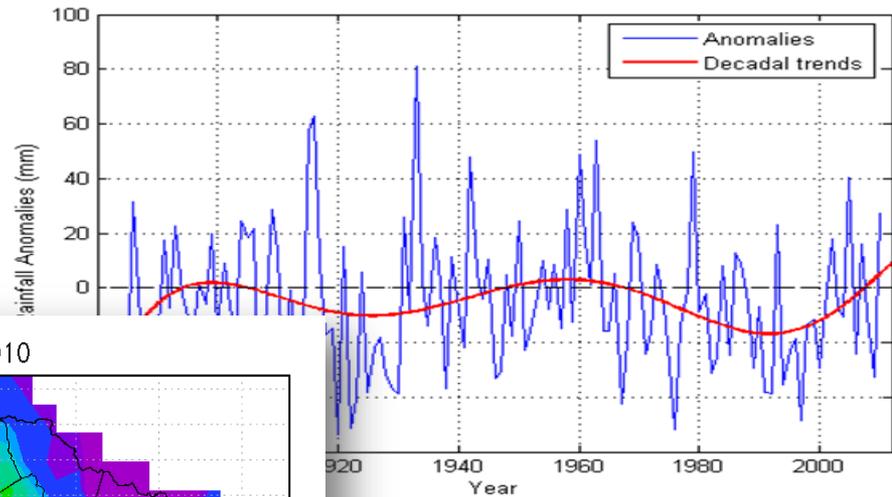
~ 0.8 degree rise since pre-industrialized times.

1



Because Jamaica's Rainfall Patterns are changing

1



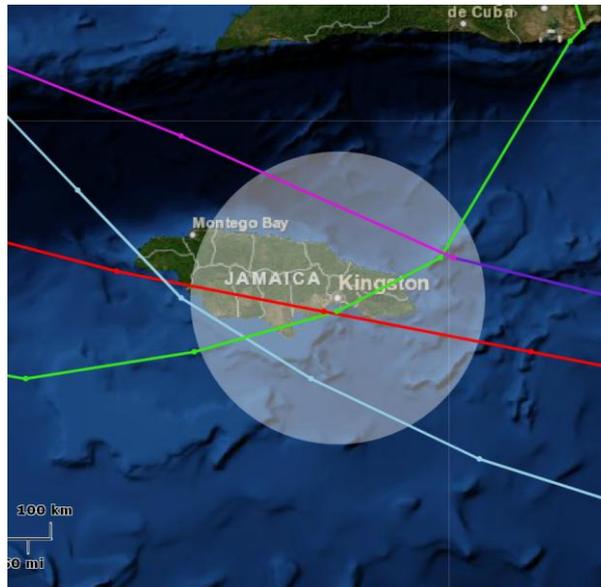
CSGM (2012)

Nature of Jamaican rain is changing (variable). Some places getting wetter, some getting drier.

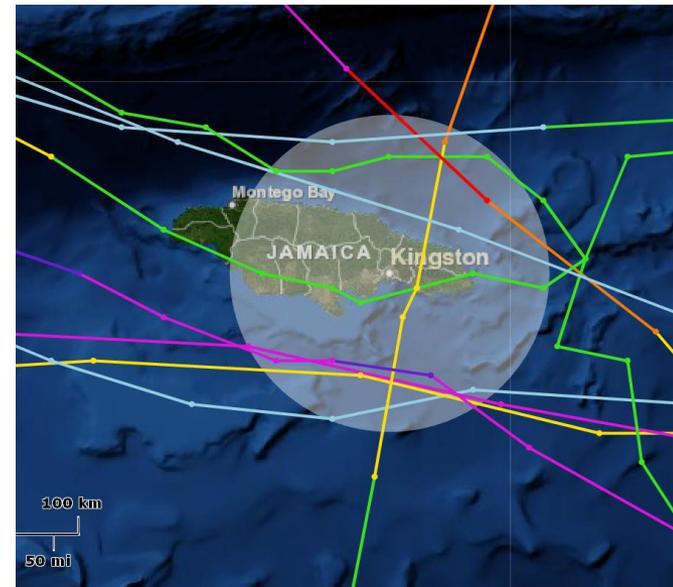


1

Because Jamaica has seen an increased occurrence of Extreme Events



1980-1999



2000-2012

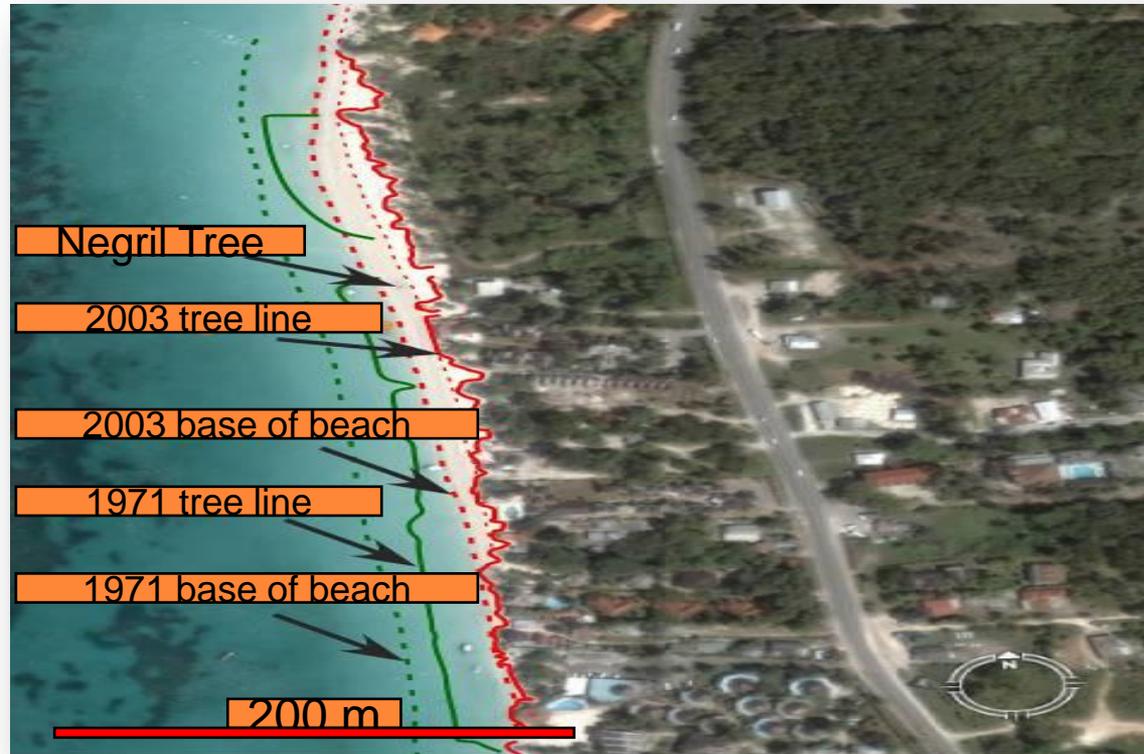
Changing climate leads to changing weather and extreme events.





Because Jamaica's sea Levels are rising

1



Marine Geology Unit, UWI:

Sea levels are rising at ~3.5 mm/yr (post 1993)





Why Science?

Science makes the case for:

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Why we must act...

...Climate change is real for Jamaica and therefore so is our vulnerability

2

When we must act...

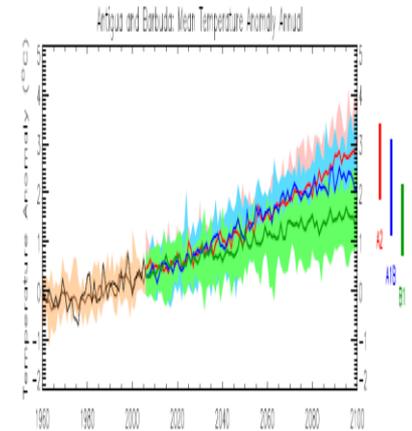
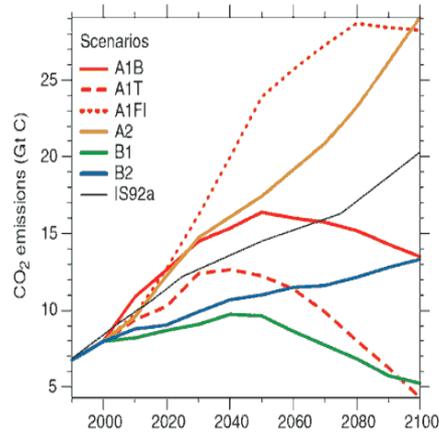




1

2

Projecting future climate...



Storylines

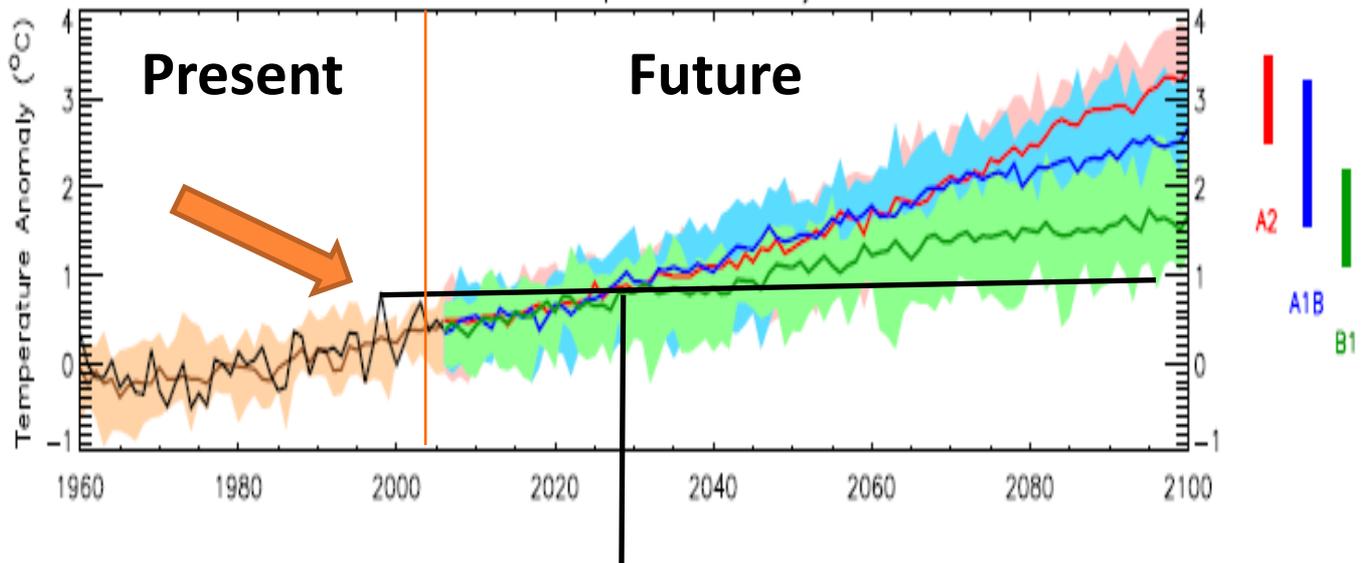
Models

Future
Climates



Now, because Jamaica's temperatures will continue to get hotter...

Mean Temps



- By mid 2020s- mid 2030 every year (in the mean) will be warmer than hottest year felt to date. ← **Climate departure!!**
- Mora et al. (2013) puts it at 2023

1

2

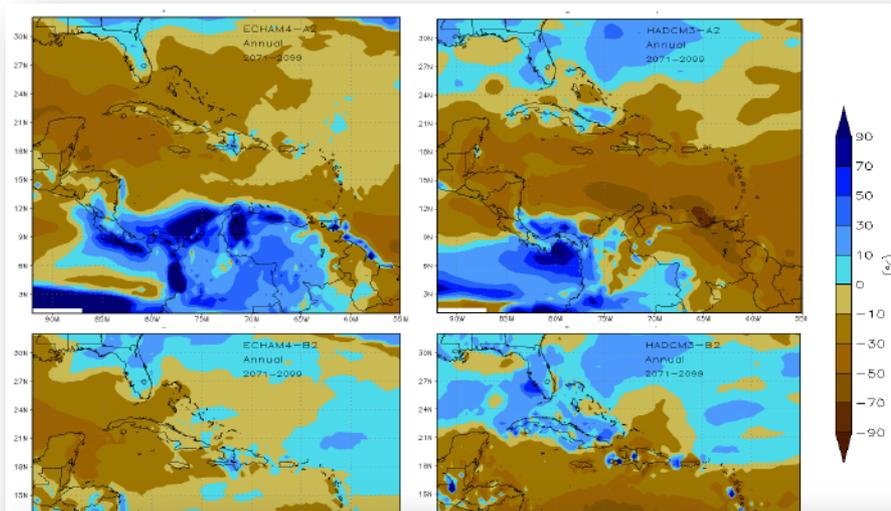


Now, because Jamaica's rainfall will become more variable and less...

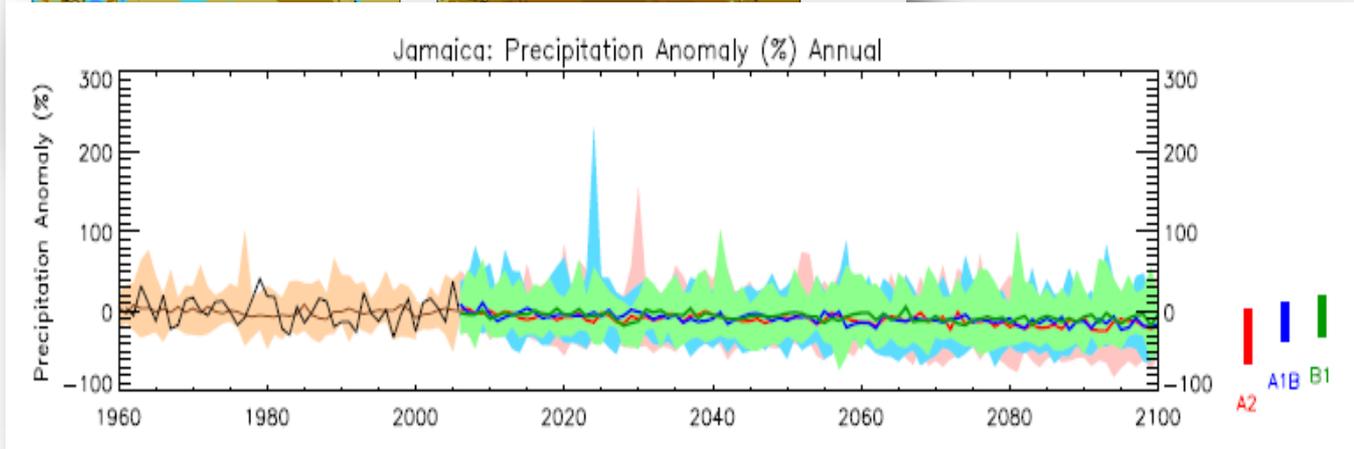


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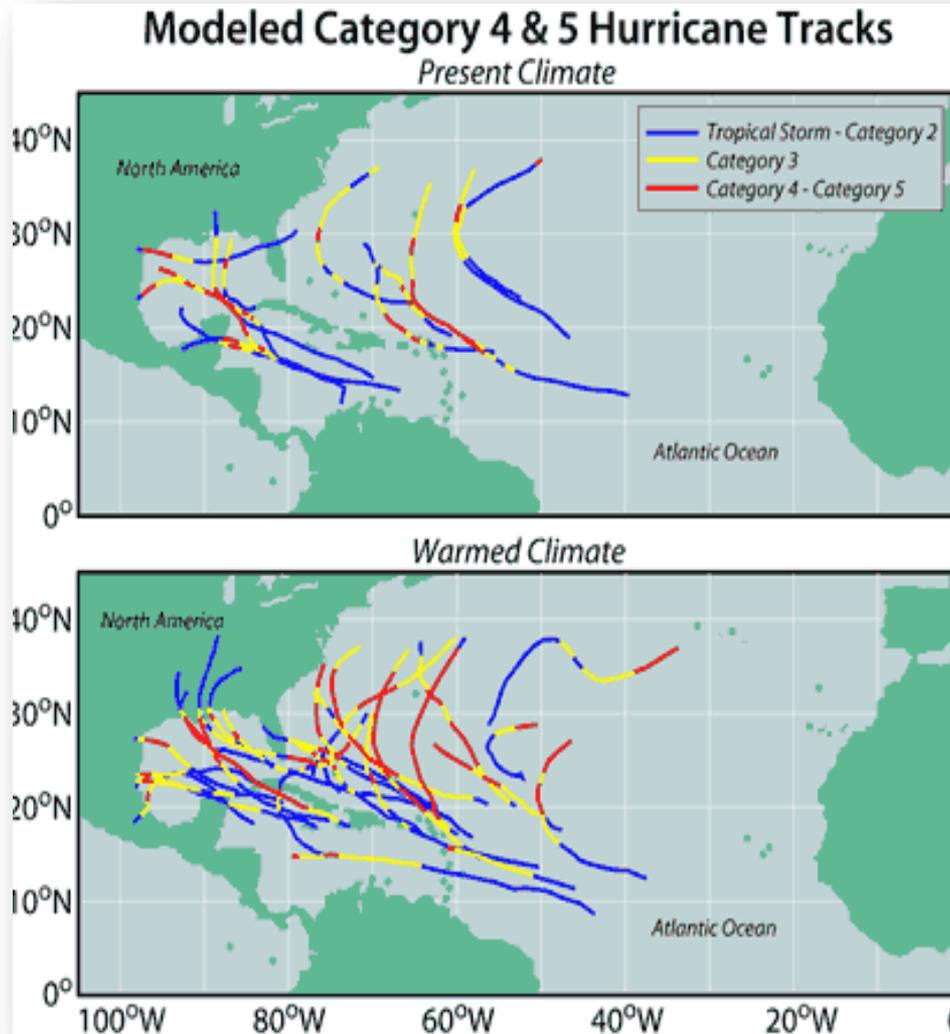


- **Drying :**
25% -30%
by 2100
- **Still**
variable!



McSweeney et al (2008) & Campbell et al. (2010):

Now, because hurricanes will likely be more intense...



Number of simulated storms remains the same but **more intense, with higher rainfall rates and increased maximum winds.**

Bender et al (2010):



1

2

Now, because Jamaica's sea levels will continue to rise...



Table 3: Summary of Global Sea Level Rise Projections for 21st Century ^{63,64,65,66,67}

	2050*	2100		
		Low Range	Central Estimate	High Range
Continuation of current trend (3.4mm/yr)	13.6 cm	-	30.6 cm	-
IPCC AR4 (2007)	8.9 cm to 23.8 cm	18 cm	-	59 cm
Rahmstorf (2007)	17cm to 32 cm	50 cm	90 cm	140 cm
Horton et al. (2008)	~ 30 cm		100 cm	
Vermeer and Rahmstorf (2009)	~40 cm	75 cm	124 cm	180 cm
Grinstead et al. (2009)	-	40 cm	125 cm	215 cm
Jevrejeva et al (2010)	-	60 cm	120 cm	175 cm

Impacts from a 2m SLR on Jamaica - UNDP/CARIBSAVE (2010)

1. Land area lost (1% of Jamaica).
2. People displaced (1% Jamaica).
3. Damage or loss to power plants (20% in Jamaica)
4. Tourism resorts damaged or lost (18% Jamaica).
5. Loss or damage of airports (60% Jamaica).
6. Loss of roads (2% Jamaica).
7. Loss or damage to port structures (100% Jamaica)

1

2





Why Science?

Science makes the case for:

1

Why we must act...

...Climate change is real for Jamaica and therefore so is our vulnerability

2

When we must act...

...Now! Climate will continue to change and therefore our vulnerability will grow

3

How we must act...



As if we know climate change will Impact our Agriculture

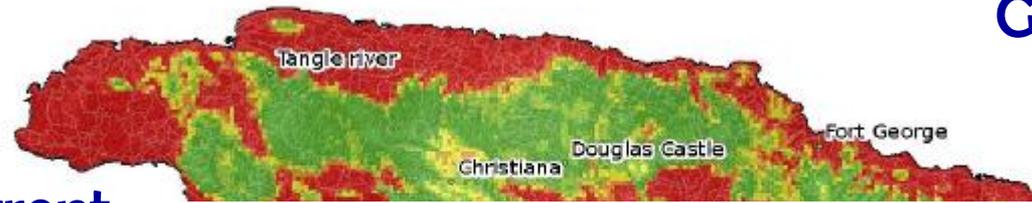


Suitability Maps

Ginger

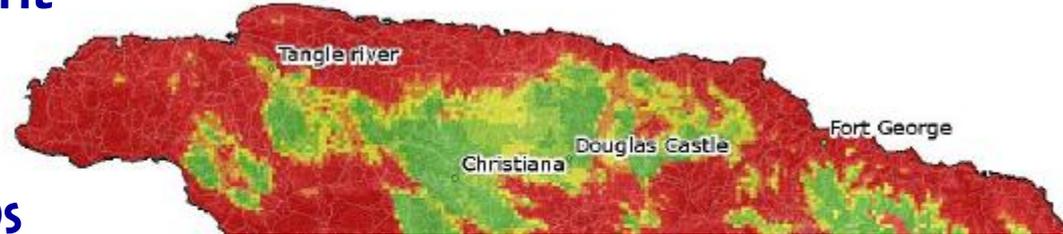
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Current



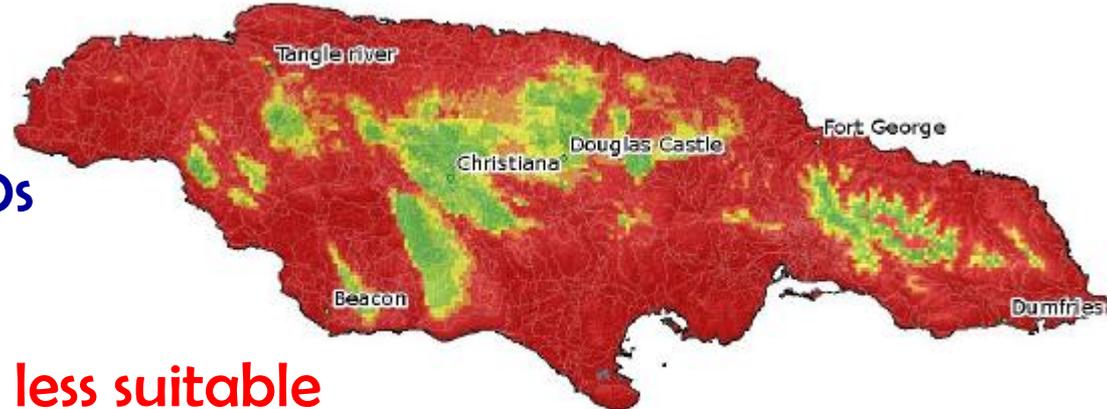
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2030s



3

2050s



27% less suitable

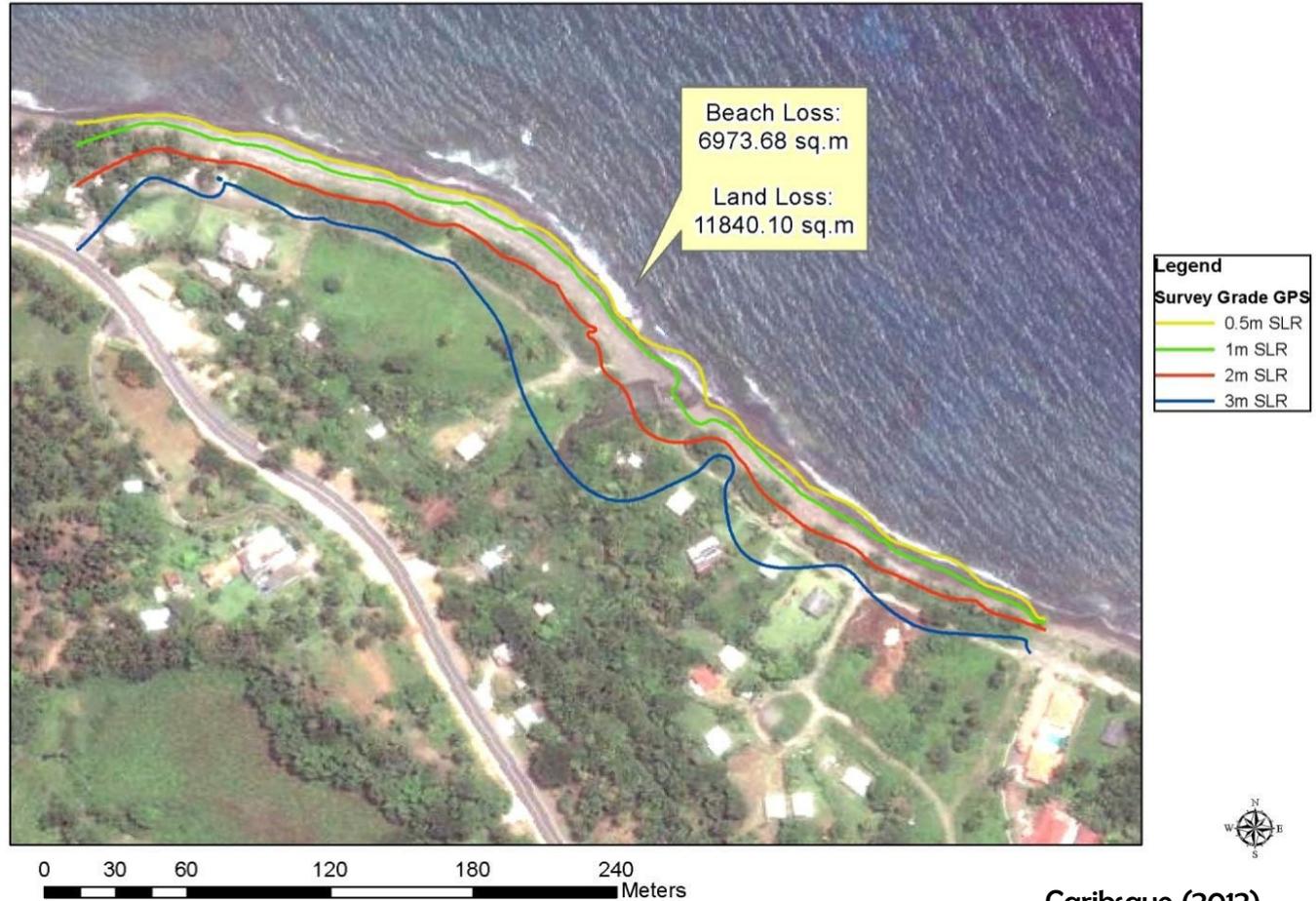


CIAT (2011)

As if we know it will impact our coastal infrastructure and settlements



Jamaica: Land Loss From Sea-level Rise Hope Bay, Portland Parish



1

2

3

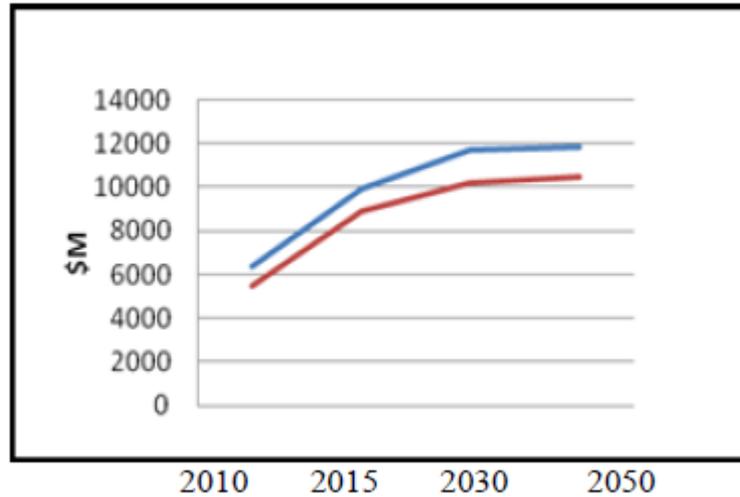
As if we know it will Impact our Tourism and biodiversity.



1

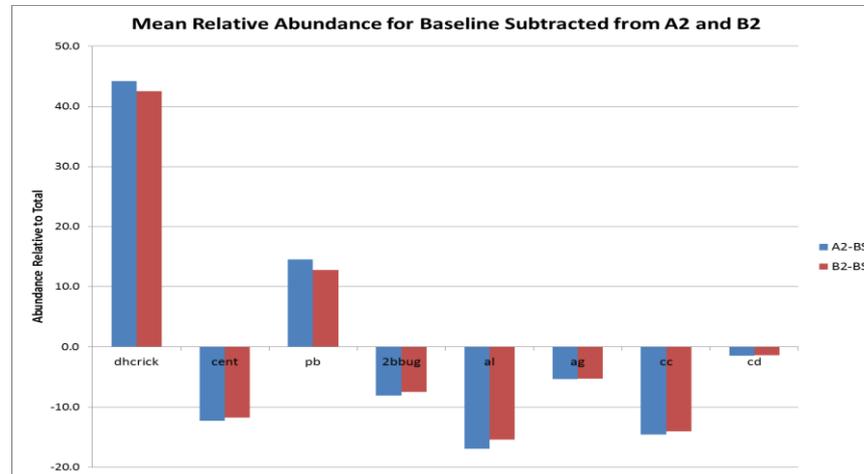
2

3



Aggregate cost of sea level rise and acidification: blue – A2; red- B2

Boxill et al. (2011)



Change in relative abundance of specie in Hellshire Hills

Stephenson et al. (2014)





1

Act in targeted ways informed by the science:

2

Mitigation

‘...efforts to reduce the amount of greenhouse gases in the atmosphere, either by reducing them at source or by creating sinks for the gases.’

3

Adaptation

‘...recognizes the inevitability of present and upcoming change and advocates pursuing options to facilitate living with the changed climate’

Education

‘...providing information and engendering behavioural change’





Why Science?

Science makes the case for:

1

Why we must act...

...Climate change is real for Jamaica and therefore so is our vulnerability

Informed

2

When we must act...

...Now! Climate will continue to change and therefore Jamaica's vulnerability will grow

3

How we must act...

Timely

...In a targetted, evidenced based manner so that the real, growing vulnerabilities of Jamaica are addressed

Transformational



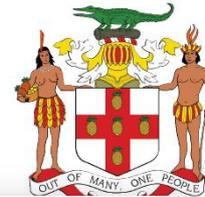


1

2

3

[State of the Jamaican Climate 2012]



NEAR-TERM CLIMATE SCENARIOS FOR JAMAICA

SUMMARY FOR POLICYMAKERS

Prepared by:

The Climate Studies Group Mona

University of the West Indies

April 28, 2014

2012

State of the JAMAICAN CLIMATE

Information for Resilience Building

Summary for Policymakers





IN SUMMARY

1

Jamaica's quest for resilience is premised on a pervasive vulnerability due to extreme climate sensitivity

2

Jamaica's approach has been a multipronged and multi-stakeholder approach, including academia and science.

3

Science makes the case for why, when and how action is to occur. It is helping to ensure informed, timely and transformational action.





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Thank you