Science for Climate Change Resilience A Must!

Climate Studies Group, Mona (CSGM)
Department of Physics
University of the West Indies, Mona

WHAT IS…?

Climate Change

Distinct changes in measures of climate lasting for a long period of time

Natural Variations	Volcanic Eruptions	Human Activity
		

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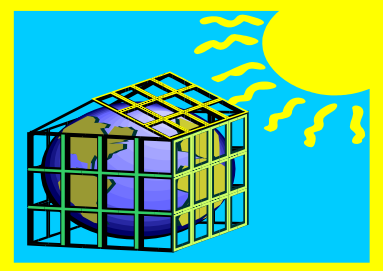
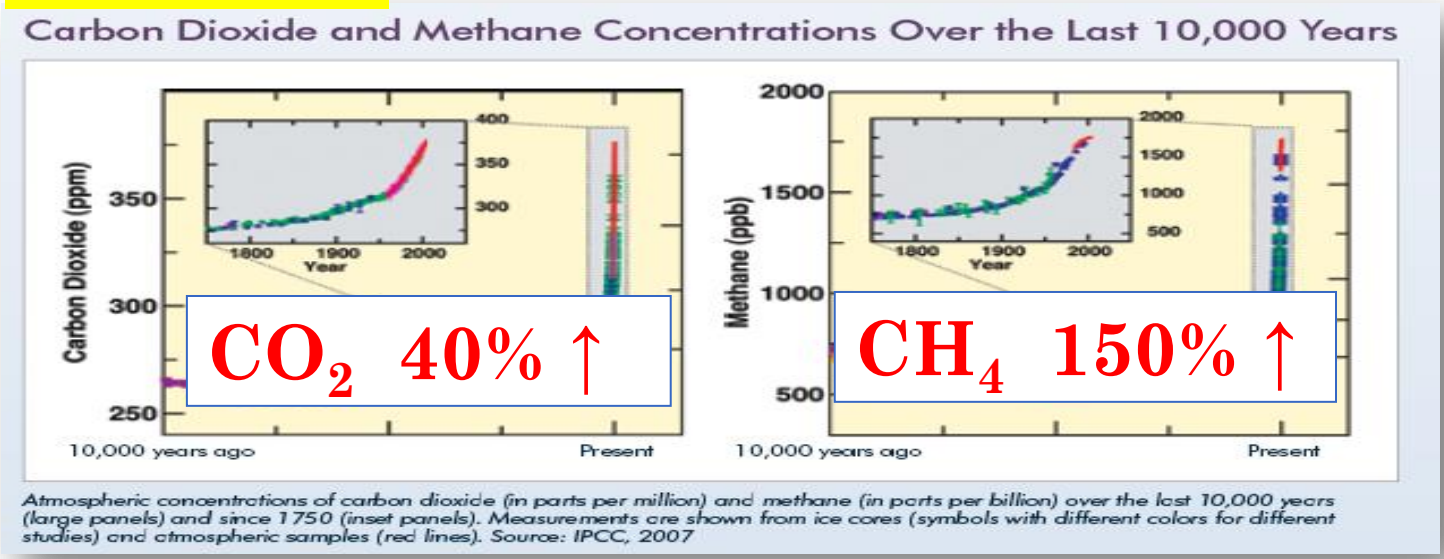
Climate Change

Distinct changes in measures of climate lasting for a long period of time



Greenhouse Gases

Blanket earth. Keeps it warm.

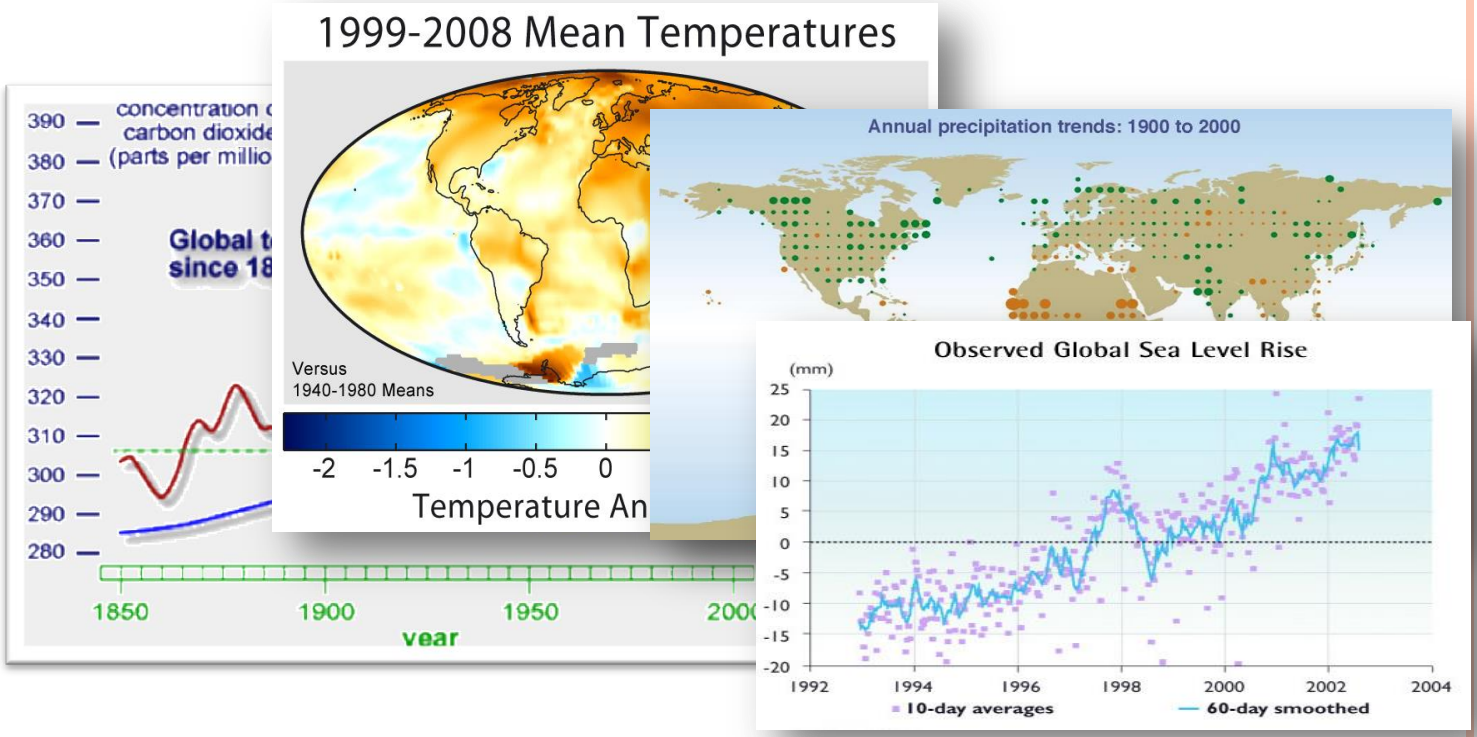


Atmospheric concentrations of carbon dioxide (in parts per million) and methane (in parts per billion) over the last 10,000 years (large panels) and since 1750 (inset panels). Measurements are shown from ice cores (symbols with different colors for different studies) and atmospheric samples (red lines). Source: IPCC, 2007

WHAT IS…?

Climate Change

Distinct changes in measures of climate lasting for a long period of time



WHAT IS…?

Climate Change

Distinct changes in measures of climate (e.g. temperatures, rainfall) lasting for a long period of time resulting from human activities.

Is Science Important to Jamaica's quest for Resilience

Yes, Yes and Yes!

3 Reasons

Science makes the case for:

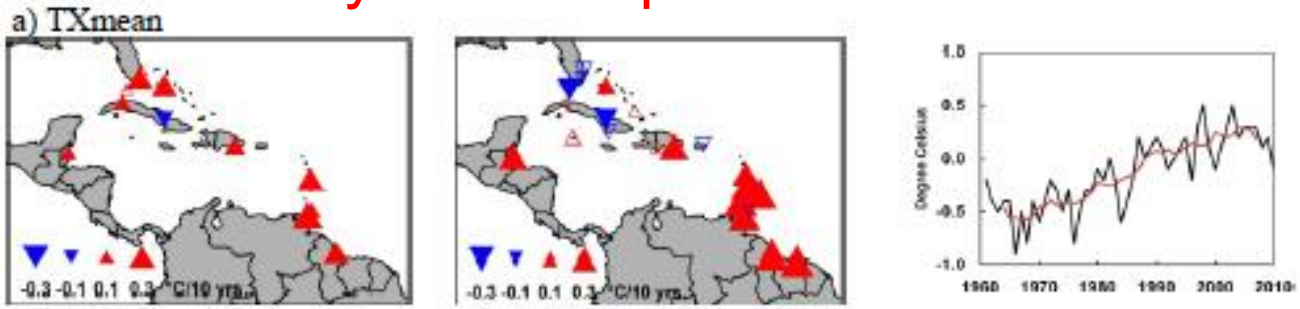
1

Why we must act…

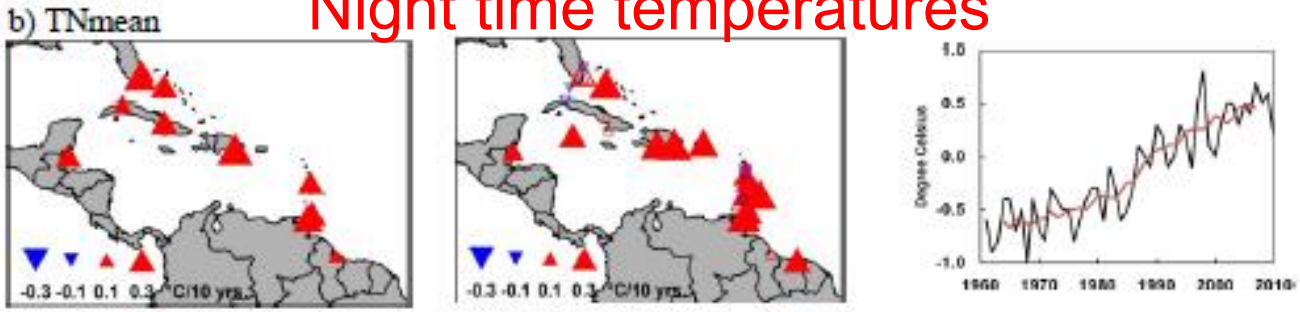
Temperatures are increasing

1

Day time temperatures



Night time temperatures



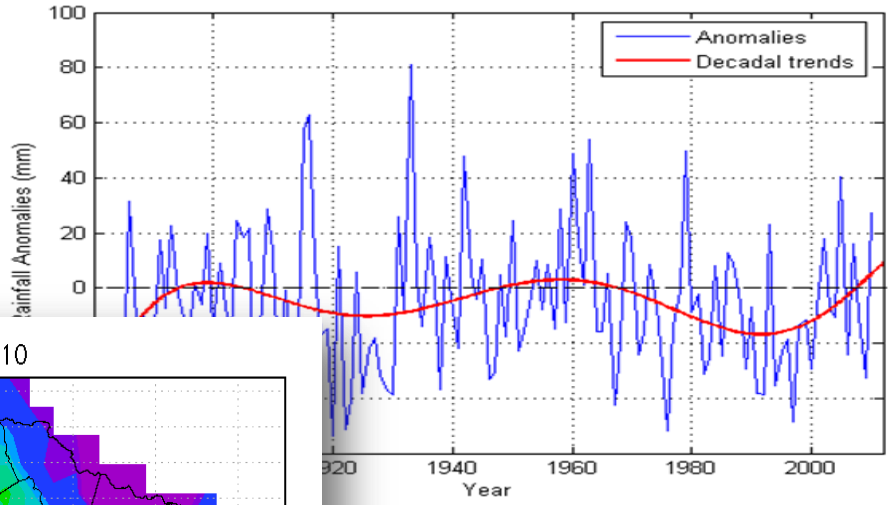
1961-2010 1986-2010

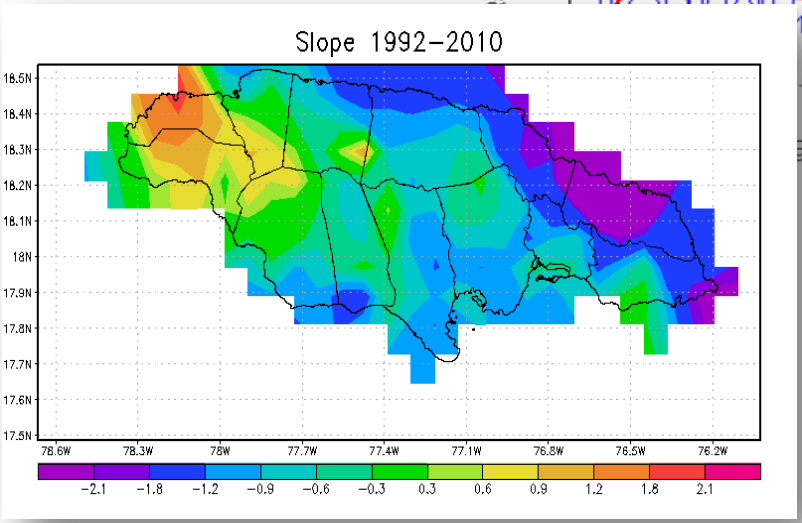
Stephenson et al (2014)

~ 0.8 degree rise since pre-industrialized times.

Rainfall Patterns are changing

1



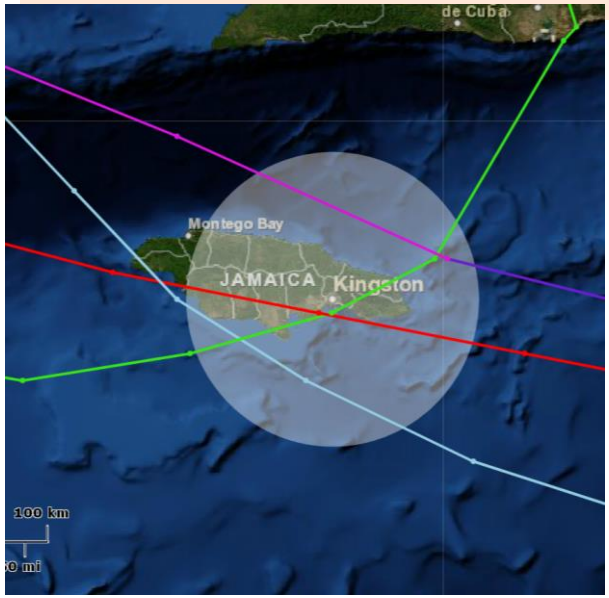


CSGM (2012)

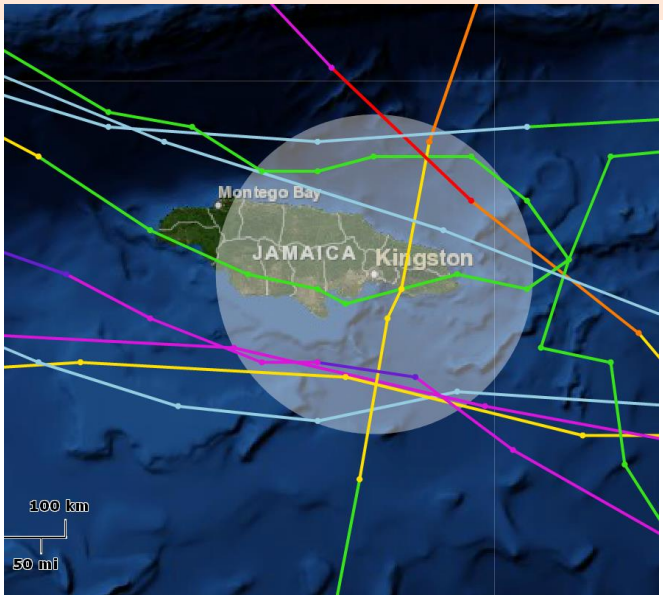
Nature of Jamaican rain is changing (variable). Some places getting wetter, some getting drier.

Increased occurrence of Extreme Events

1



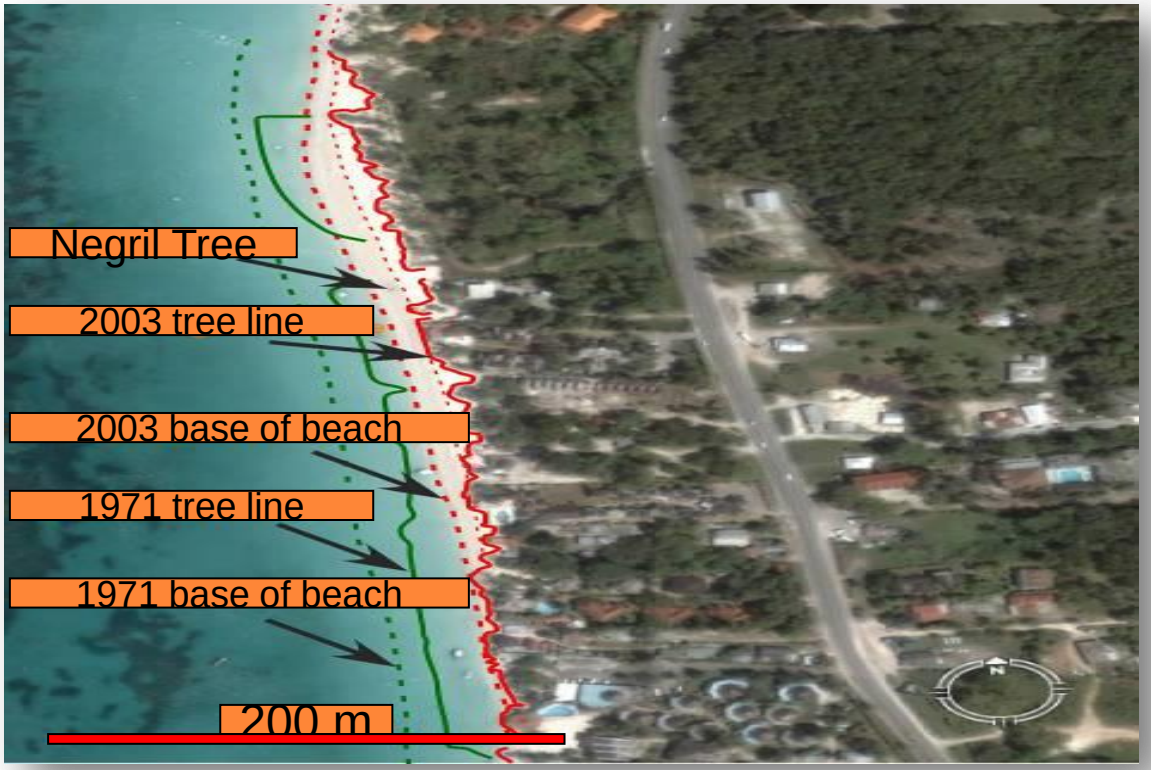
1980-1999



2000-2012

Changing climate leads to changing weather and extreme events.

Sea Levels are rising



Marine Geology Unit, UWI:

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

Science makes the case for:

1. **Why we must act…**

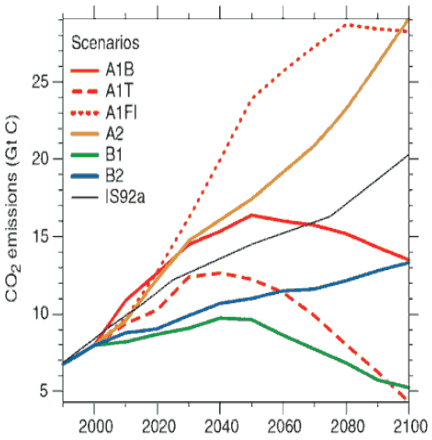
   …Because something is happening!

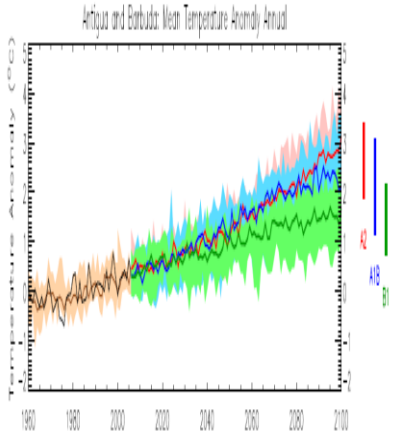
2. **When we must act…**

Projecting future climate…

1

2





Storylines

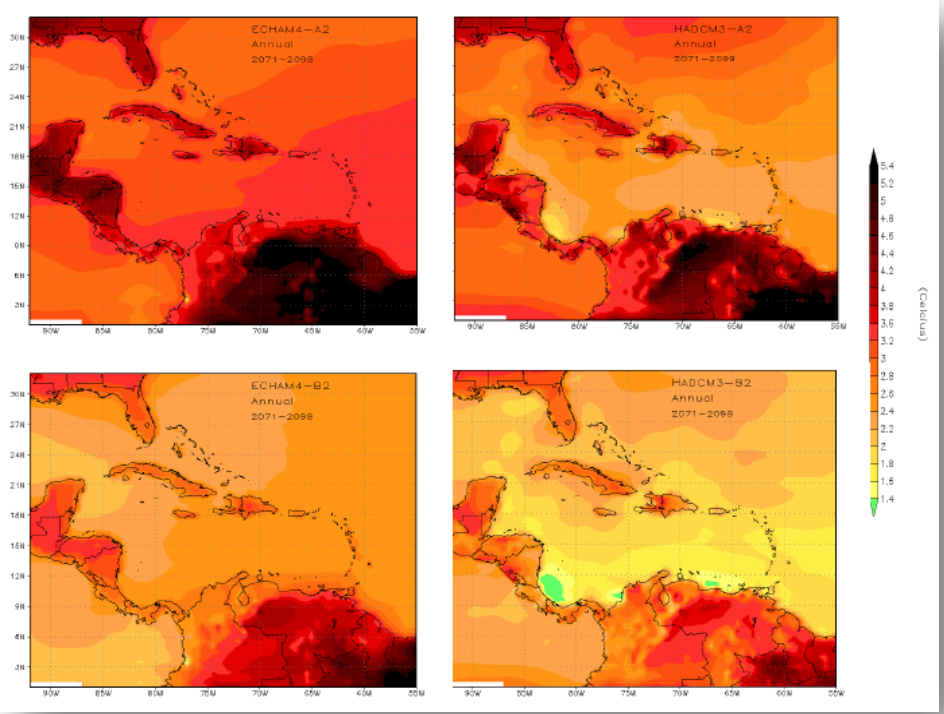
Models

Future Climates

Temperatures will get hotter…

1

2



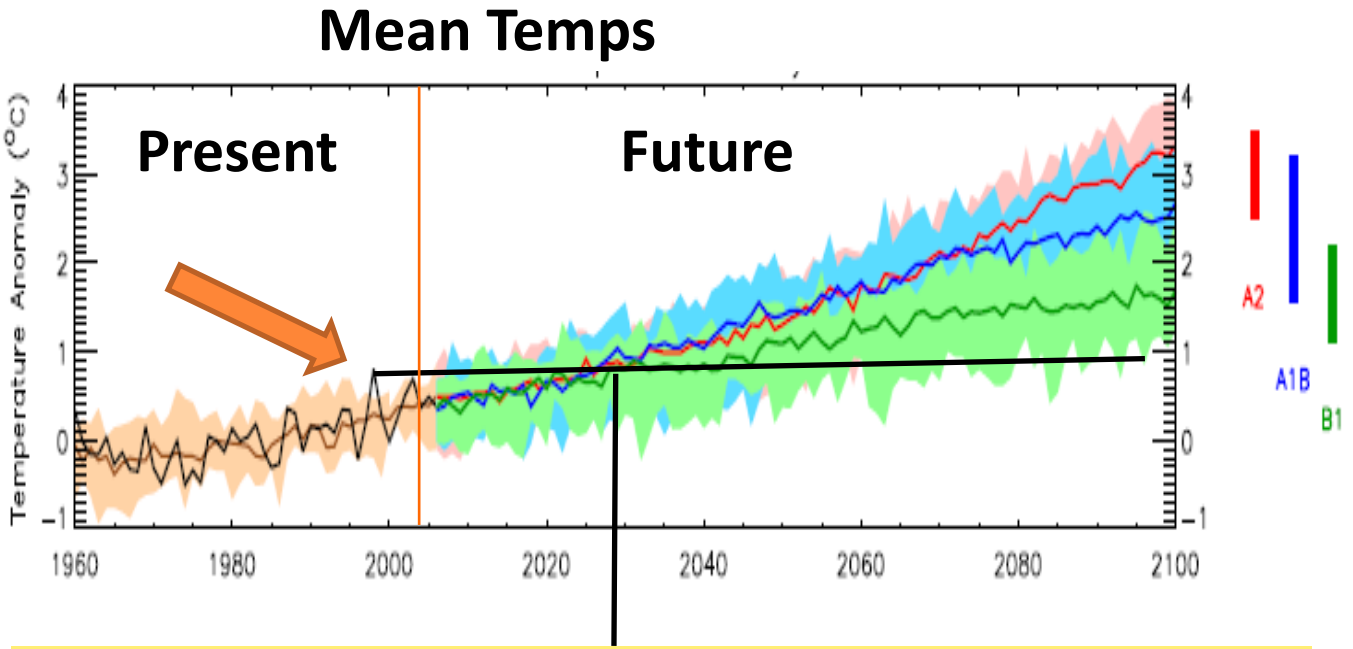
Campbell et al (2010)

- End of Century (2100)
- 1 – 3.5°C hotter
- More hot days and nights as currently defined.
- Larger than any century scale increase ever seen before!

Temperatures will get hotter…

1

2

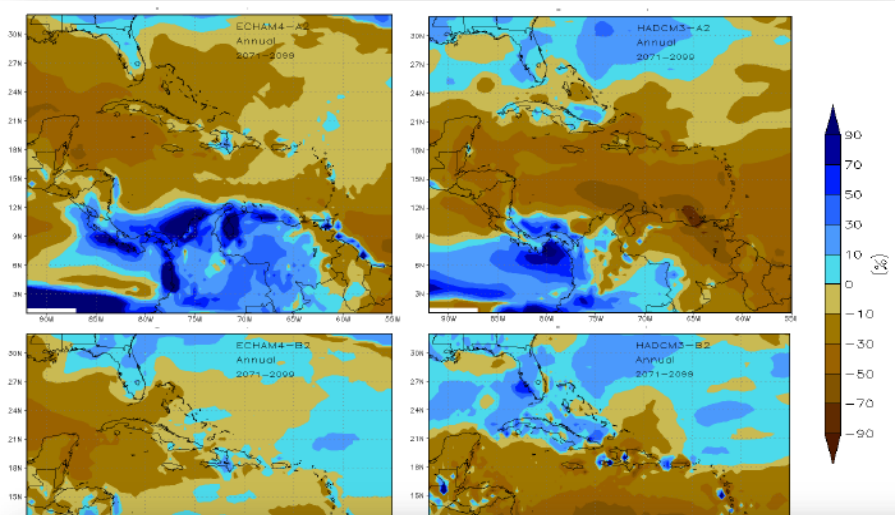


- By mid 2020s- mid 2030 every year (in the mean) will be warmer than hottest year felt to date. ← **Climate departure!!**
- Mora et al. (2013) puts it at 2023

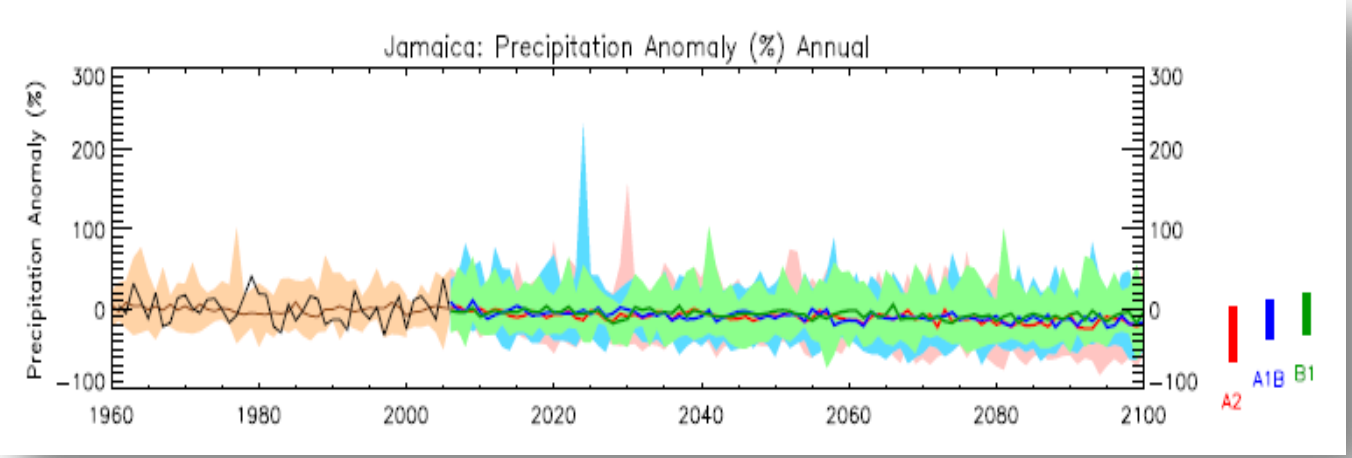
Rainfall will still be variable but less…

1

2



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

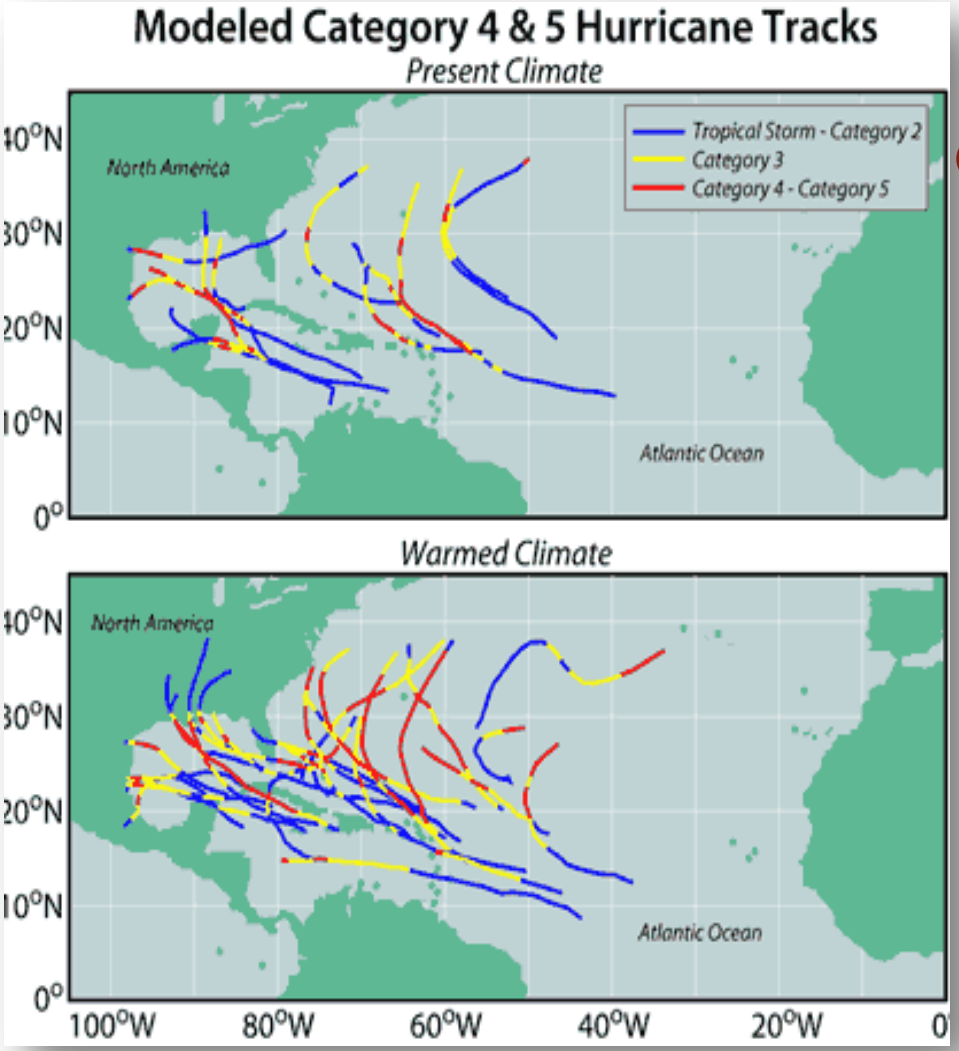


McSweeney et al (2008) & Campbell et al. (2010):

Hurricanes will be more intense...

1

2



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

Bender et al (2010):

Sea levels will continue to rise…

1

2

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)

Science makes the case for:

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3. **How we must act…**

Impact on Agriculture - Banana

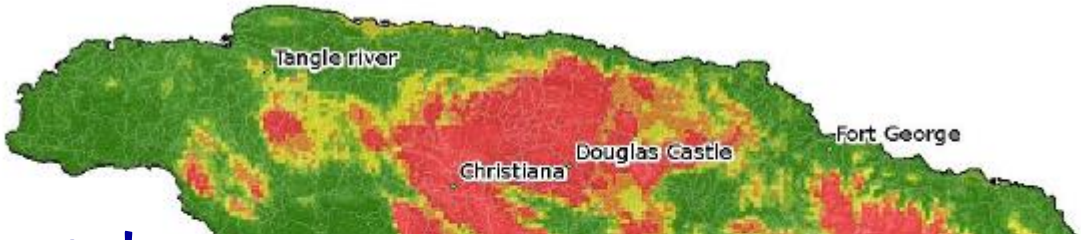
Suitability Maps

1

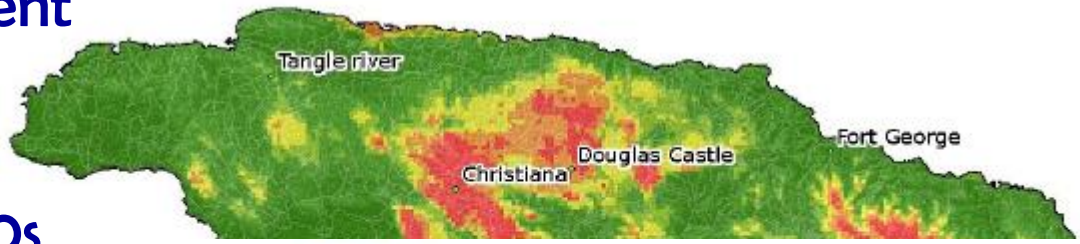
2

3

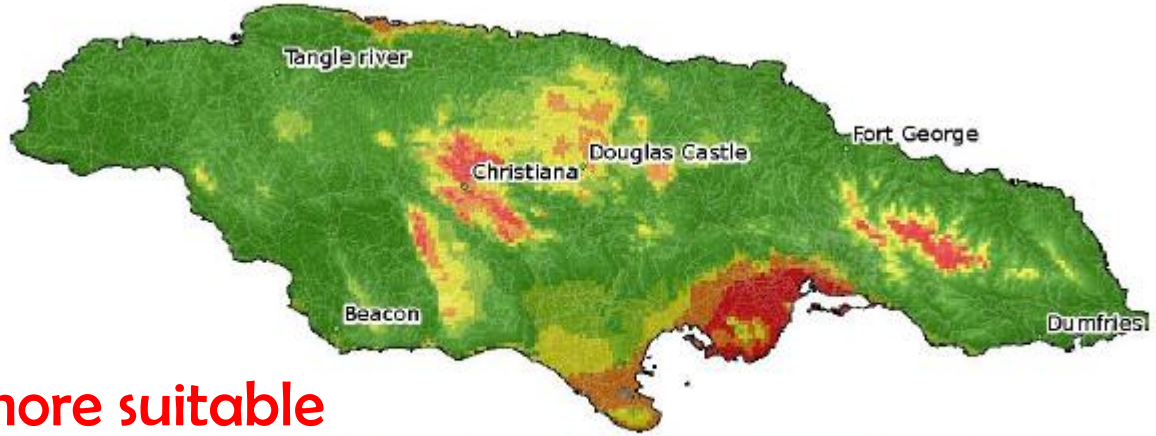
Current



2030s



2050s



18% more suitable

CIAT (2011)

Impact on Agriculture - Ginger

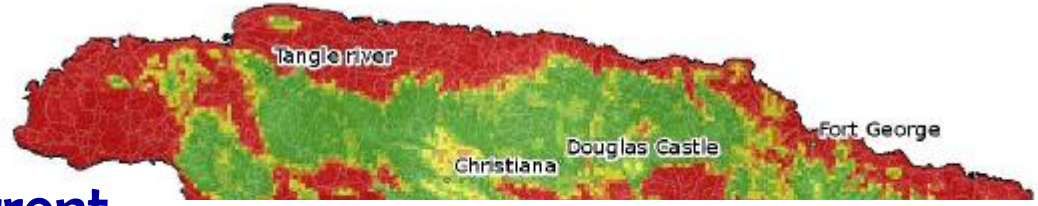
Suitability Maps

1

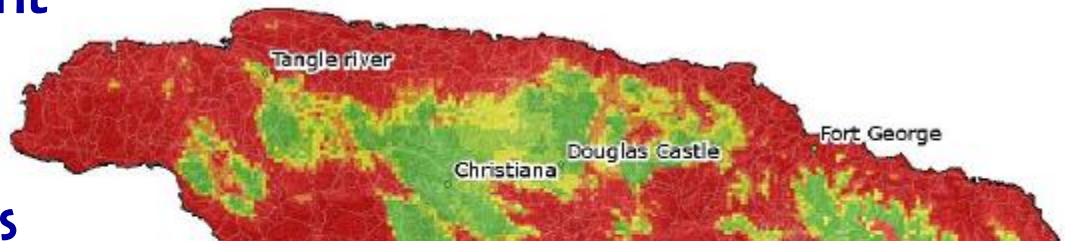
2

3

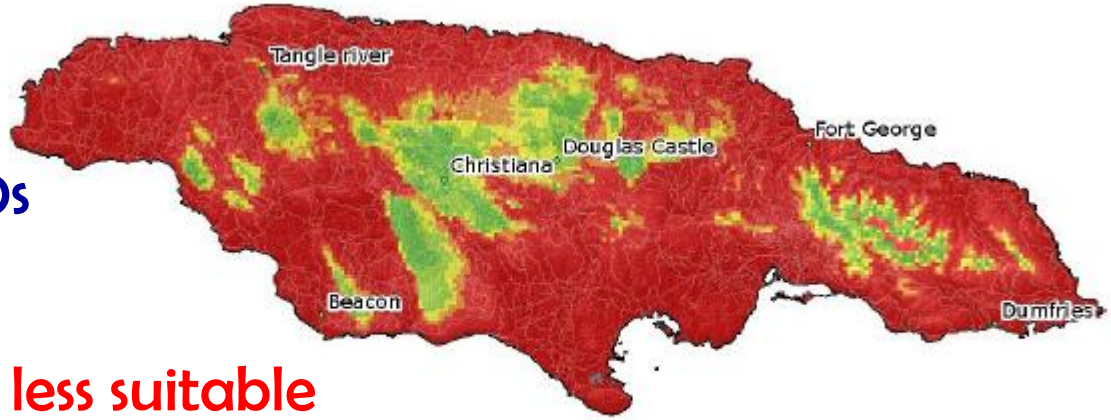
Current



2030s



2050s



27% less suitable

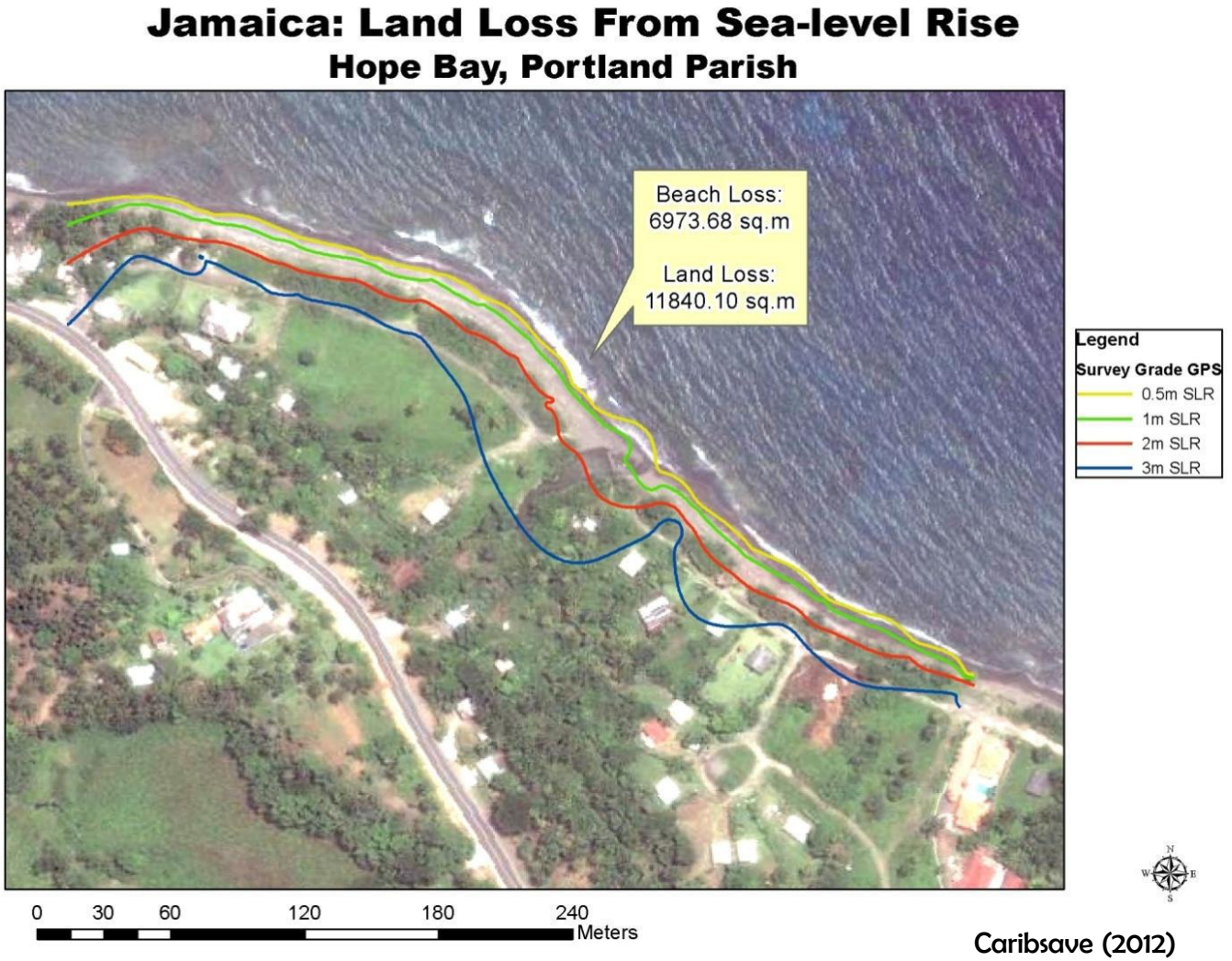
CIAT (2011)

Impact on Land Area

1

2

3



Caribsave (2012)

Impact on Tourism or biodiversity

1

2

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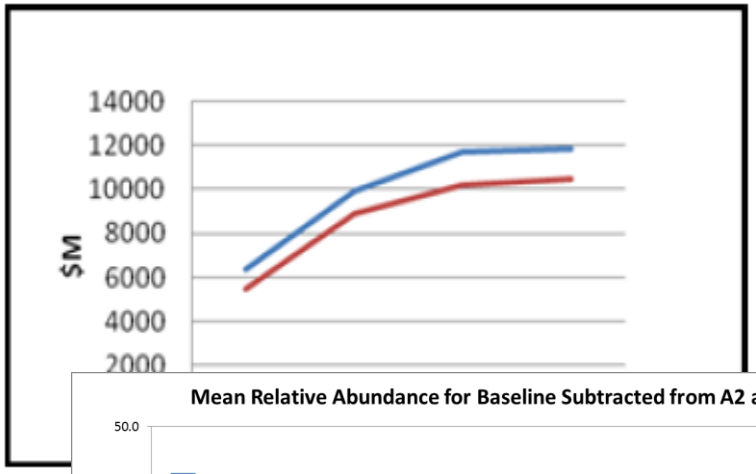
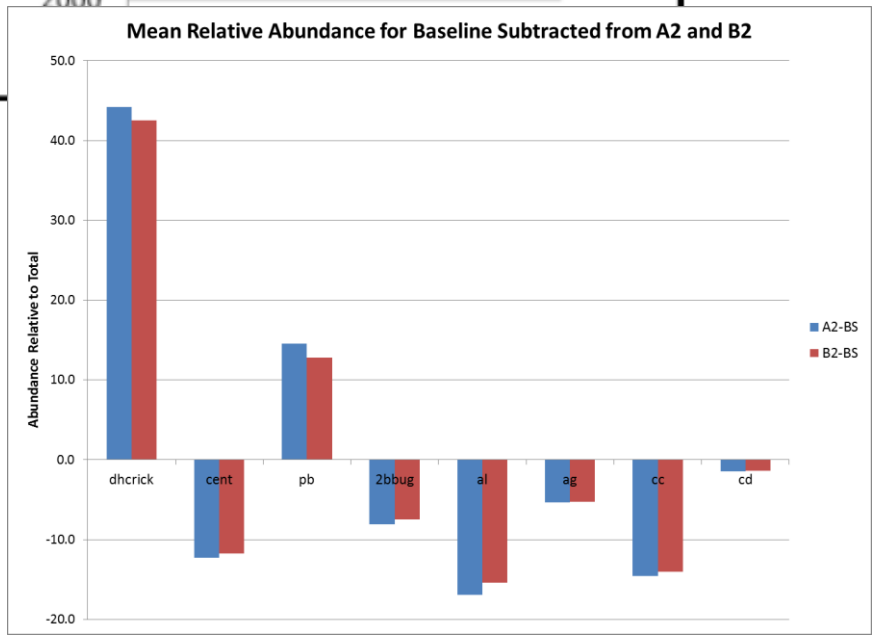


Aggregate cost of sea level rise and acidification: blue – A2; red- B2

Boxill et al. (2011)



Change in relative abundance of specie in Hellshire Hills

Stephenson et al. (2014)

Science is defining the scope for the action.

1

2

3

Not just any action but targeted action on the basis of evidence.

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.'

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"

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   …As if we know something!

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Yes, Yes and Yes!

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Thank you