Climate Variability and Change in The Caribbean: Implications for Water Resources.

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Water withdrawal per capita and area

(mm/person/year)

Source: F.N. Scatena (U of Penn); M.C. Larsen (USGS-Puerto Rico)
Water needs to produce national diet

( mm/year )

Based on 1030 m³ per person per year

Source: F.N. Scatena (U of Penn); M.C. Larsen (USGS-Puerto Rico)
Modelling Storylines Used: A1B, A2, B2

**A1B:**
1. Very rapid economic growth.
2. Global population peaks in mid-century and declines thereafter.
3. Rapid introduction of new and more efficient technologies.
4. Economic convergence among regions.
5. Capacity building and increased cultural and social interactions.
7. Balanced consumption of energy across all energy sources.
8. Assumes similar improvement rates apply to all energy supply and end-use technologies.
Extreme Temperature change over the Windward Islands.

Tropical Days (Days MaxTemp $\geq 30^\circ$ Celsius)
Extreme Temperature change over the Windward Islands.

Very Hot Days (Days MaxTemp $\geq 35^\circ$ Celsius)
Rainfall change over the Windward Islands
(present – future climate)

Consecutive Dry Days

Consecutive Wet Days
January Rainfall A1B Scenario
February Rainfall A1B Scenario
March Rainfall A1B Scenario
April

Rainfall
A1B Scenario
June

Rainfall A1B Scenario
Precipitation (mm/day)  Climatology  Month= 7
Future - Present

Rainfall
A1B
Scenario

Precipitation (Percentage)  Climatology  Month= 7
Future - Present

July
August

Precipitation (mm/day) Climatology Month= 8
Future - Present

Rainfall
A1B Scenario
Rainfall A1B Scenario

Precipitation (mm/day) Climatology Month = 9
Future - Present

Precipitation (Percentage) Climatology Month = 9
Future - Present

September
November Rainfall A1B Scenario
Precipitation (mm/day)  Climatology  Month= 12
Future – Present

Precipitation (Percentage)  Climatology  Month= 12
Future – Present

December

Rainfall
A1B
Scenario
So where does that leaves us?
Conclusion from The A1B Model

Broad agreement with IPCC-WG1 (Chapter 11 – Regional Climate Projections’ Summary for Caribbean Simulations)

**Temperature:**
- Annual temperature increases by end of the 21st century: range from 1.4°C to 3.2°C (median of 2.0°C)
- Average of approx. 1°C increase in sea surface temperature
- Increase in number of very warm days

**Rainfall:**
- Models project decreases in annual precipitation but increase in intensity (up to 20% by 2050)
- Reduced length of rainy season 7-8% by 2050
- Increased length of dry season 6-8% by 2050
Conclusion from the A2 and B2 Scenarios models (PRECIS)

• **General drying across the Caribbean basin:**
  The decreases in rainfall range from **25 to 50%** depending on the scenario and section of the Caribbean basin.

The exception to the overall drying trend is in the far north of the Caribbean, including western Cuba and the southern Bahamas – **all are up to 25% wetter under the scenarios.**
Conclusion from the A2 and B2 Scenarios models (PRECIS)

• The effect of climate change appears to enhance the existing climatic pattern:
  – Making the wet and dry zones wetter and drier respectively, during the first 4 – 6 months of the year.
  – In May to October the entire Caribbean is up to 25% drier.
  – The changes in average rainfall show a pronounced north-south gradient in rainfall change during the January to April dry season.
  – Indicates summer drying to become more severe during the wet season.
So what are the implications for water resources?

That’s for you to answer!
What mitigation/adaptation actions could be taken?

(Re: Dr. Adrian Cashman)

- **Supply Side** – harness more of the available water;
- **Demand side** – utilise what we have more efficiently and effectively;
- **Water management systems** – ensure that they are physically and institutionally robust and resilient.
Thank You!