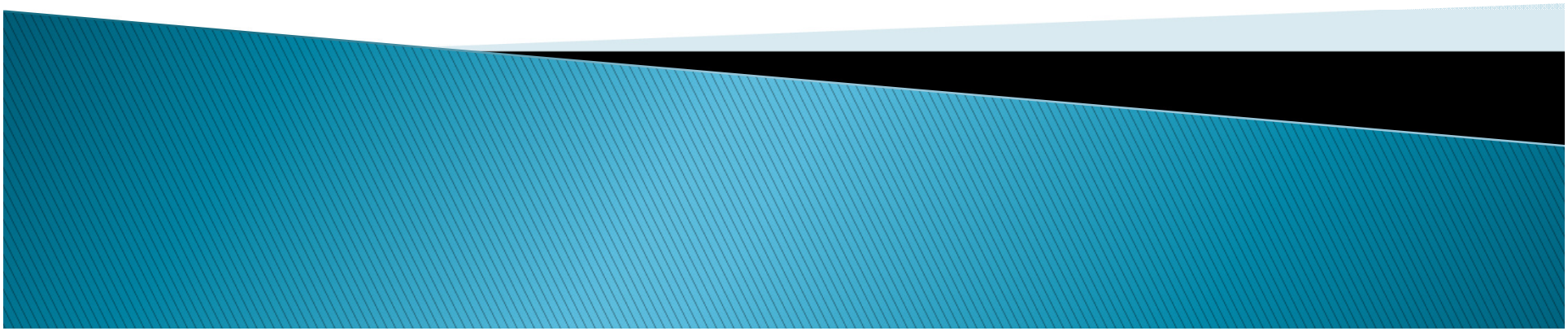
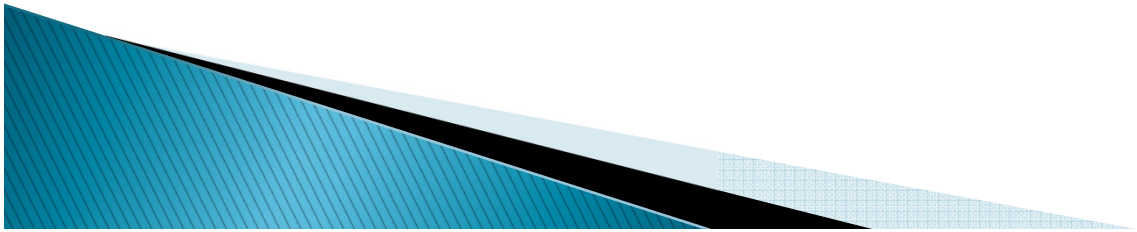
Climate Dimensions and Water Resources

Climate Outlook, Water Security and Rainwater Harvesting



Overview

- Climate outlook
- Water security
- Rainwater harvesting



Climate outlook – What do we expect

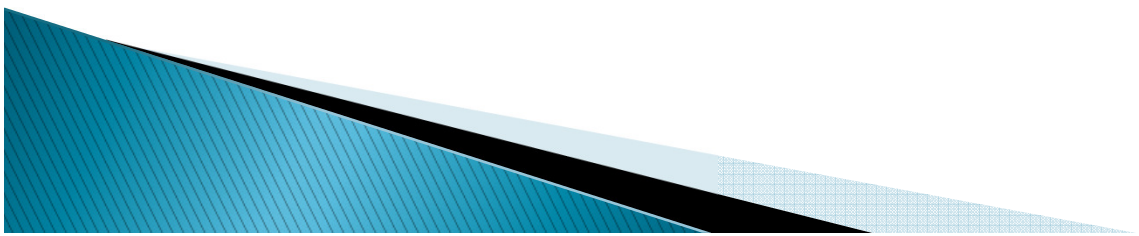
Temperatures (2075–2099)

- A1B emissions scenario
  - 2.5–3 °C rise in temperatures for the northern and southern Caribbean
  - 2–2.5 °C for the eastern Caribbean for the.
  - Increase in the number of days and nights where temperatures exceed 35 °C during the day and 25 °C at night
  - Greater warming in the summer months than in the cooler, drier early months of the year
- **Sea level rise**
  - Between 5 – 10 mm per year

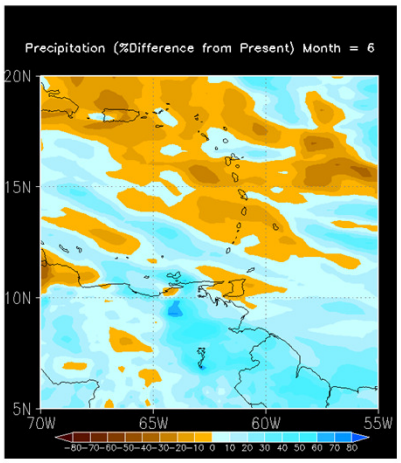
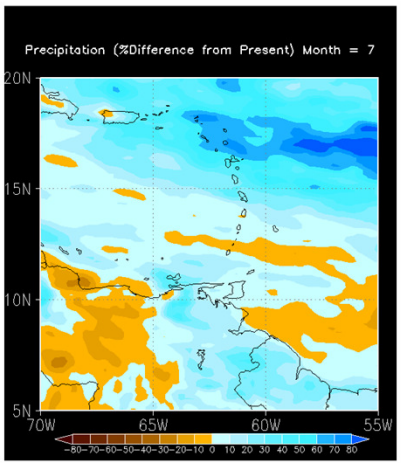
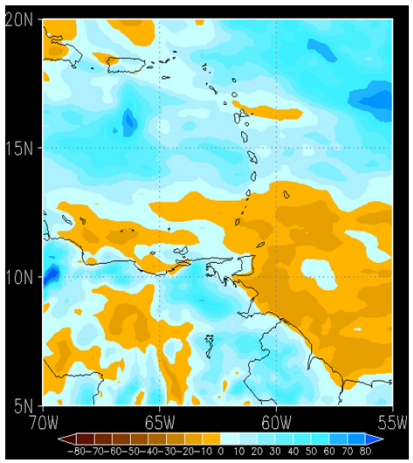
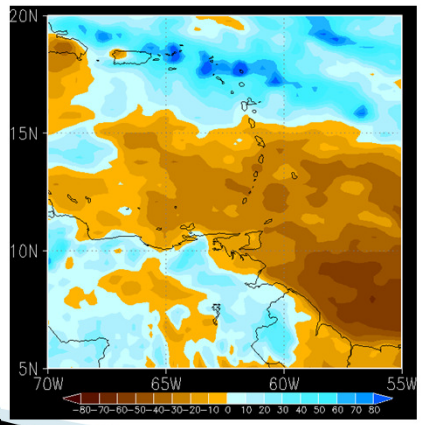
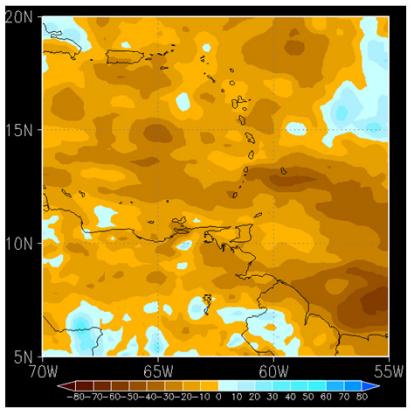
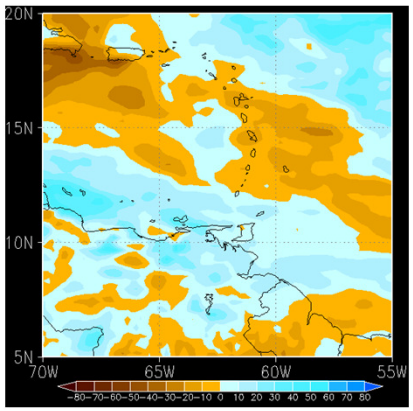
Climate outlook – What do we expect

Rainfall (2075–2099)

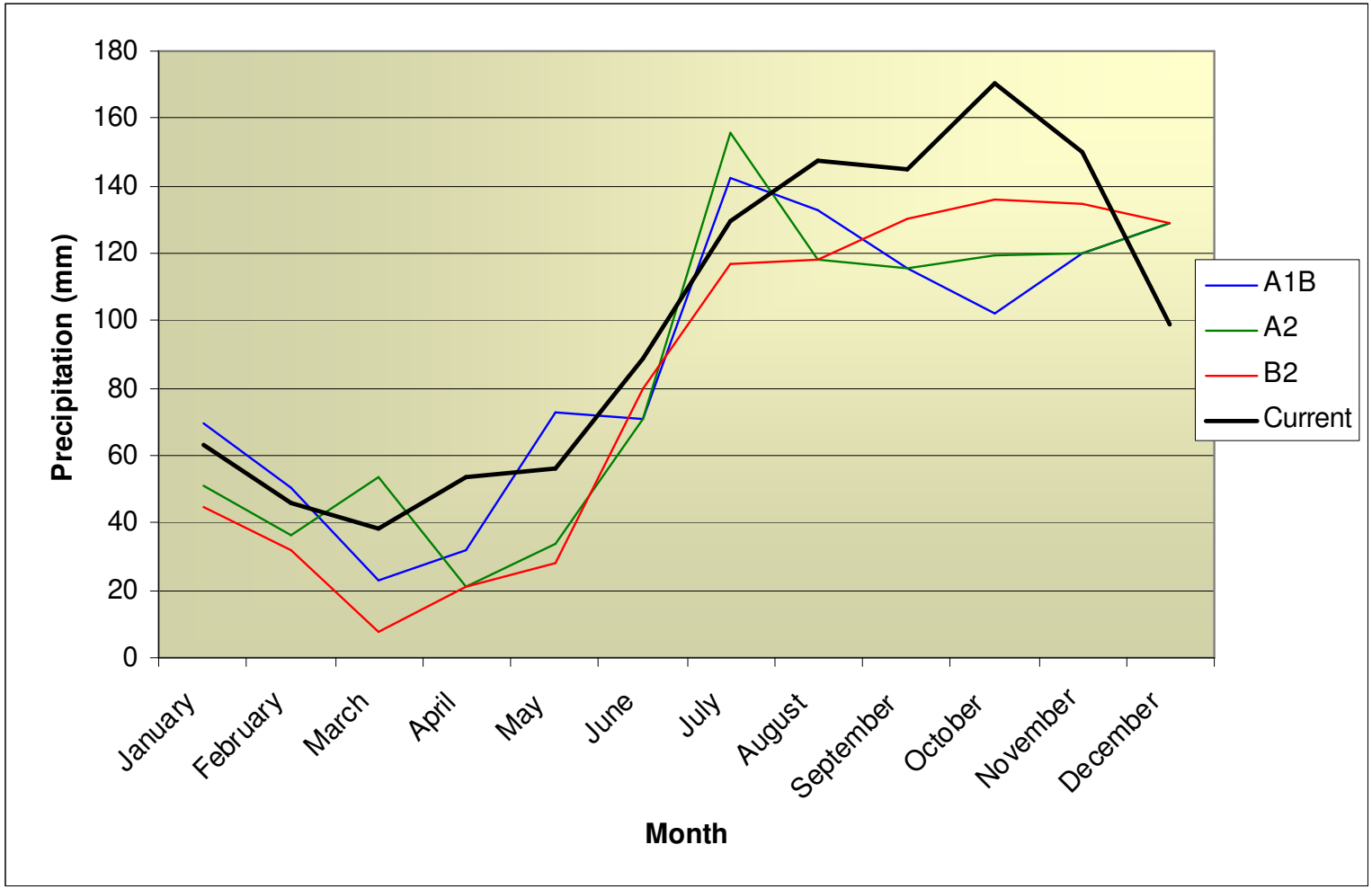
- Decrease in annual precipitation of 10%–30% by 2080
  - Wet season a 30% decrease in monthly precipitation for the Northern and 20% for the Eastern Caribbean is projected
  - Belize and Guyana increases of between 20% and 30% during the wet season are projected
  - Analysis of the mean daily precipitation indicates:
    - 10%–15% decrease in higher intensity rainfall for the northern Caribbean
    - Increase in intensity of at least 15% for the southern Caribbean
    - No change for the Eastern Caribbean
- General drying trend, by 2050:
  - Reduced length of rainy season 7–8%
  - Increased length of dry season 6–8%



Changes in Monthly Rainfall Patterns, A1B Scenario 1990's-2070's

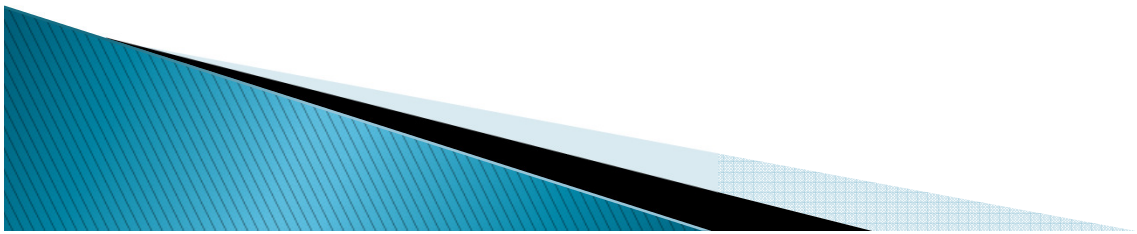
June	July	August
		
September	**October**	**November**
		

Barbados' Climate Change



Impact of reduced precipitation on RWH in the Grenadines (Peters, 2010)

Current operational Parameters	Change in rainfall	Required change in roof area	Required change in tank size	Required change in per capita consumption
Roof area 112m^2	– 5%	+6.5%	+ 82%	– 5.5%
Tank size 100 m^3	– 10%	+8.5%	+ 140%	– 12%
Per capita use 78 l/p/d	– 15%	+ 19%	Not possible	– 15%
Occupancy 4.9	– 20%	+ 27%	Not possible	– 19%



So, some things to think about:

1. What about climate variability?
2. What does this mean for water resources?
3. What does it mean for water supplies?

Some uncomfortable facts

- Many Caribbean countries experience seasonal shortages
- Demand exceeds supply during parts of the year
  - Barbados is 'closed'
  - St Lucia 35% deficit
  - Jamaica in deficit 2015
  - Trinidad in deficit since 2000
  - Un-accounted for water often >40%
- Add periodic drought events
- Demand often peaks in dry season
- Populations becoming more urbanised

Water security

- So what might this mean for the state of water resources in the Caribbean?

What is water security?

You tell me……

Water Security

Global Water Partnership has defined a water secure world as one that:

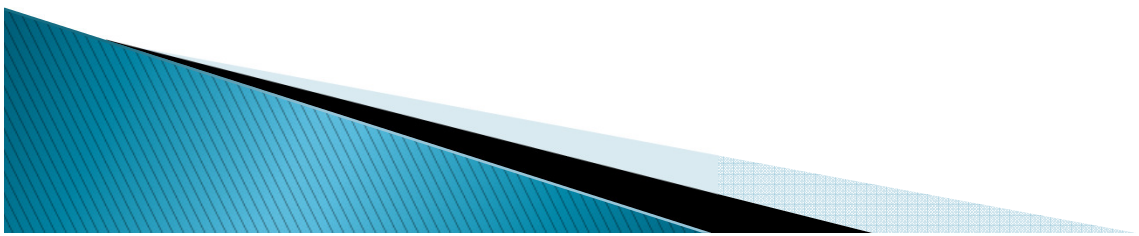
"…integrates a concern for the intrinsic value of water together with its full range of uses for human survival and well-being……harnesses water's productive power and minimises its destructive force……where every person has enough safe, affordable water to lead a clean, healthy and productive life." and "It is a world where communities are protected from floods, droughts, landslides, erosion and water-borne diseases."

OR

Water security is defined as the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. (UN-Water, 2013)

Elements of Water Security

- Adequacy
  - Conditions governing water resource availability in time and space that satisfies often competing demands and the nature of the demands that drive exploitation
- Accessibility
  - Ensuring that water is available when and where it is needed in such a way that is not an undue burden
- Assurance
  - Ability to secure safe and sufficient resources to cope with potential system shocks such as extreme events, security threats and contaminated resources.
- Affordability
  - For providers and users of water services; how water management and services are to be paid for



Rainwater Harvesting

- The Challenges

Examples

Challenges: SLEEP T

- Social
- Legal
- Economic
- Environmental
- Political
- Technical

- Loss of control
- Backward
- Improved water supply?
- Inclusion in policy prescriptions

- Initial cost
- Operational cost
- Loss of revenue to Utility
- Utility push-back
- Economic incentives

Political	Economic

- Acceptability
- Perception

- Maintenance
- Reliability

- Backflow

Social

Technical

- Regulation
- Health & safety
- Codes of practice
- Building codes

Legal

- Pollution
- Diseases
- Water quality

Environmental

Addressing the challenges

- Do we think that RWH is a viable Adaptation measure in the face of climate change
  - Context e.g. other available options
- Should we encourage RWH
  - What for ?
  - How ?