

Flooding and Resilience against Climate Change Impacts in SIDs

Presented by Eng. Fazir Khan

“Climate Change is the defining issue of our time and we are at a defining moment. From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale. Without drastic action today, adapting to these impacts in the future will be more difficult and costly.”

United Nations - Global Issues 2021

Outline of Presentation

- **Impacts of Climate Change**
- **Recent Experience in T&T**
- **Flooding Frequency**
- **Sea Level Rise Impacts**
- **Solutions for increased resilience**

Impacts of Climate Change on Flooding

- Increased frequency of riverine flooding
- Increased pluvial flooding
- Increased flood levels
- Increased duration of flooding

The main contributing factor to all of the above is increased occurrence of high intensity rainfall and higher intensities

Recent History in Trinidad & Tobago



Aug 2022



Oct 2018



Aug 2021

Recent History in Trinidad & Tobago

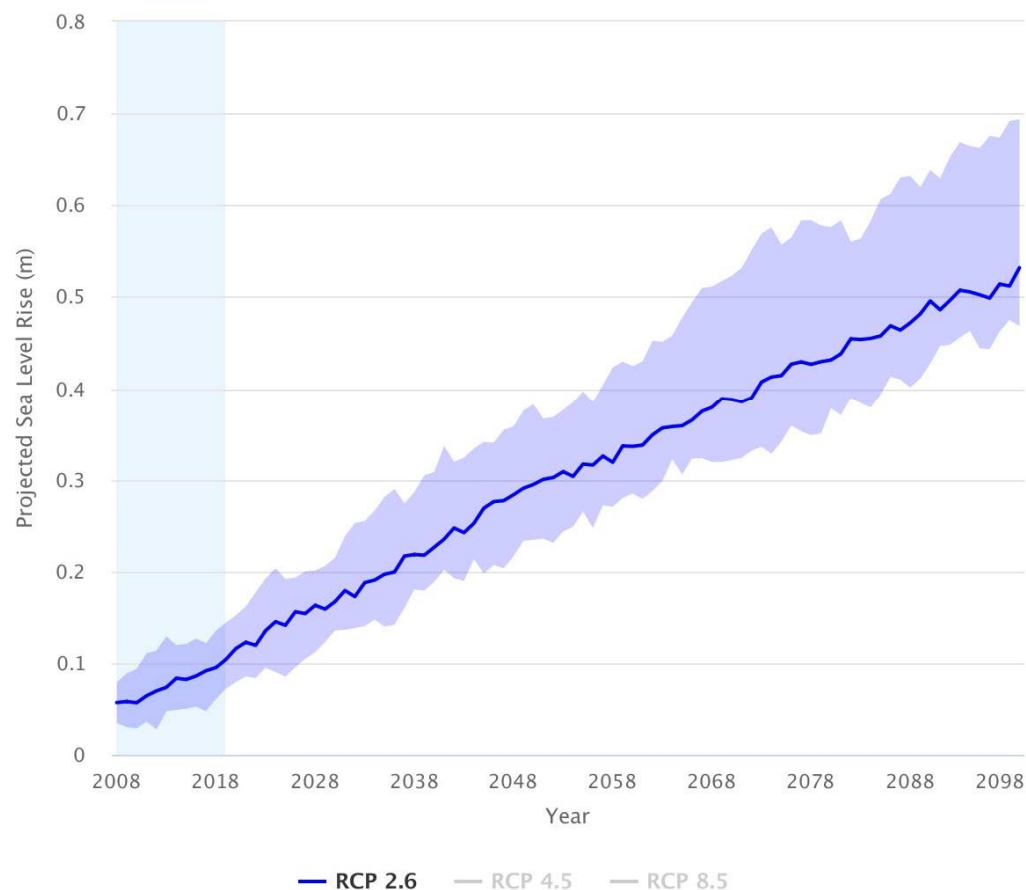


Nov 2014 – T'dad
Coastal Flooding -
Manzanilla

Impact of Climate Change

Sea Level Rise

Projected Sea Level Rise of coastal Trinidad and Tobago (2008–2019)



REF: <https://coast.noaa.gov/digitalcoast/tools/slr.html>

Mean sea level is expected to rise by at least 0.6 metres by 2100. UNDP and OECS estimates that this would permanently displace at least 110,000 people in Caricom countries and inundate over 90 per cent of the region's commercial ports. By 2050, the costs associated with rising sea level is projected to cost Caricom nations up to US\$60 billion in damage, of which US\$7 billion would be for TT.

Footnote: According to the IPCC, RCP 2.6 requires that carbon dioxide (CO₂) emissions start declining by 2020 and go to zero by 2100

Direct Impact of Sea Level Rise in the Caribbean

- Inundated Coastal Areas which make up the majority of anthropogenic settlement in the Region
- Loss of wetlands
- Decreased arable lands
- Increased duration of flooding due to tidal influence
- Elevated storm surge

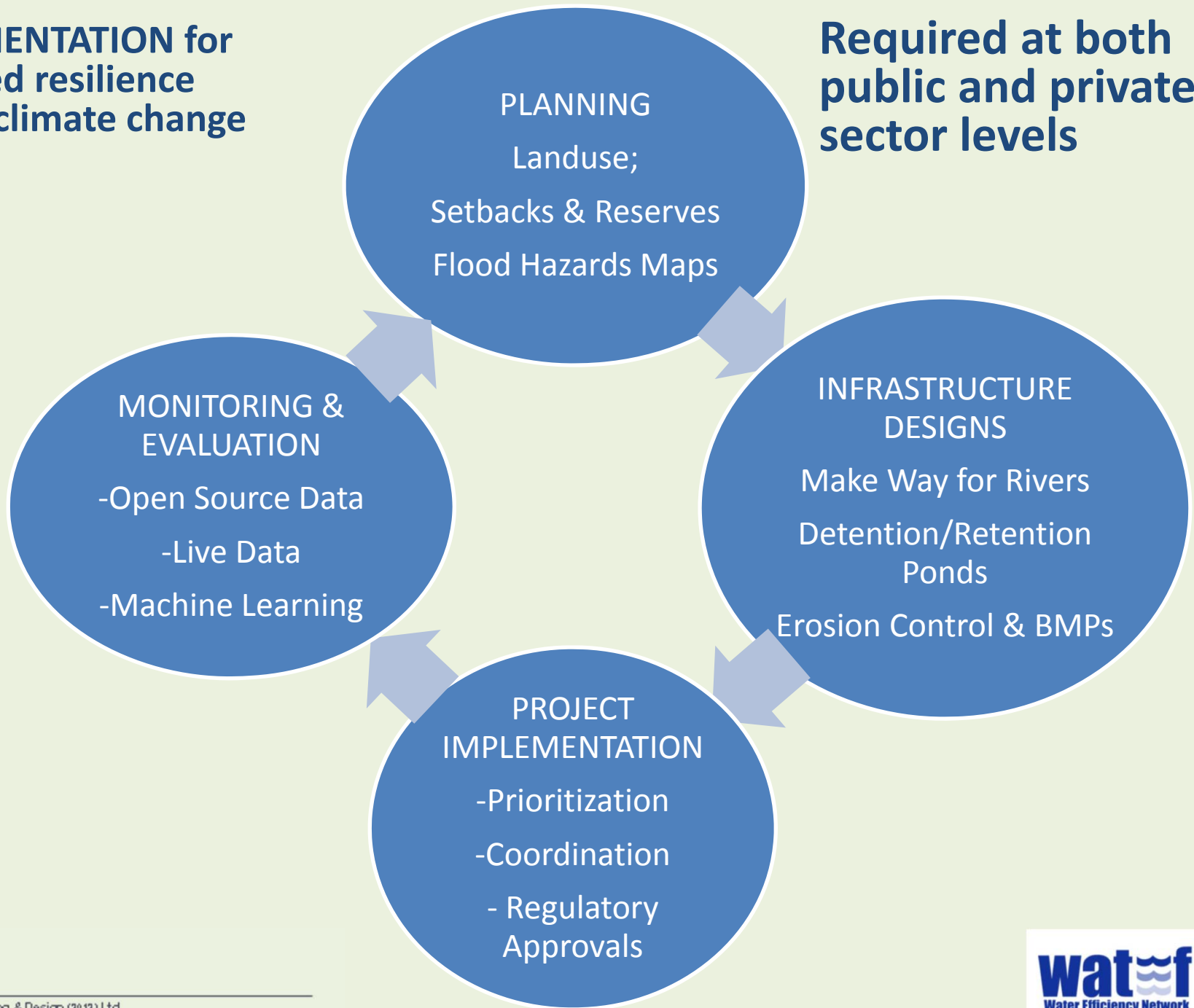
Solutions for increased resilience against climate change impacts

Climate Resilient Infrastructure Designs, these include:

- Using climate change factors in rainfall intensity estimates. CCCCCs indicate 10% increase on current IDF Curves
- Making room for rivers to overflow
- Detention and Retention Ponds
- Site selection, setbacks and reserves
- Elevate structures & important infrastructure

**IMPLEMENTATION for
increased resilience
against climate change
impacts**

**Required at both
public and private
sector levels**



Conclusions

Key Considerations aimed at mitigating flooding in the Caribbean:

We need to recognize is that Climate Change has a two-fold effect on flooding. First there is an increase in rainfall intensities in the order of magnitude of about 10% and there has also been an increase in the frequency of high intensity rainstorms, which has led to an increase in both the frequency and depth of floods. Civil Engineers cater for this our hydrological assessment.

The other major factor is SLR. The current median projection for the Caribbean is for 600mm or about 2ft increase in sea level in the next 60 years. Since all or our natural drainage systems eventually drain to the sea, there is tidal influence at the outfalls which exacerbates both the duration and depth of floods that we can experience

The next important thing is to categorize areas that are prone to flooding vs ones that are not, but even areas that are not prone to flooding can be affected by heavy protracted rainfall in terms of erosion and landslides.

Areas that are prone to flooding can be further categorized into areas where we have flash floods, like the foothills of the northern range or the central range. Other areas in the central plains of Trinidad or SW Tobago will experience long duration floods as experienced recently