

**Regional Conference  
Climate Change: Challenges and Opportunities  
for South Asia**

**Climate Change Impact and  
Adaptation in South Asia**

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# Objectives

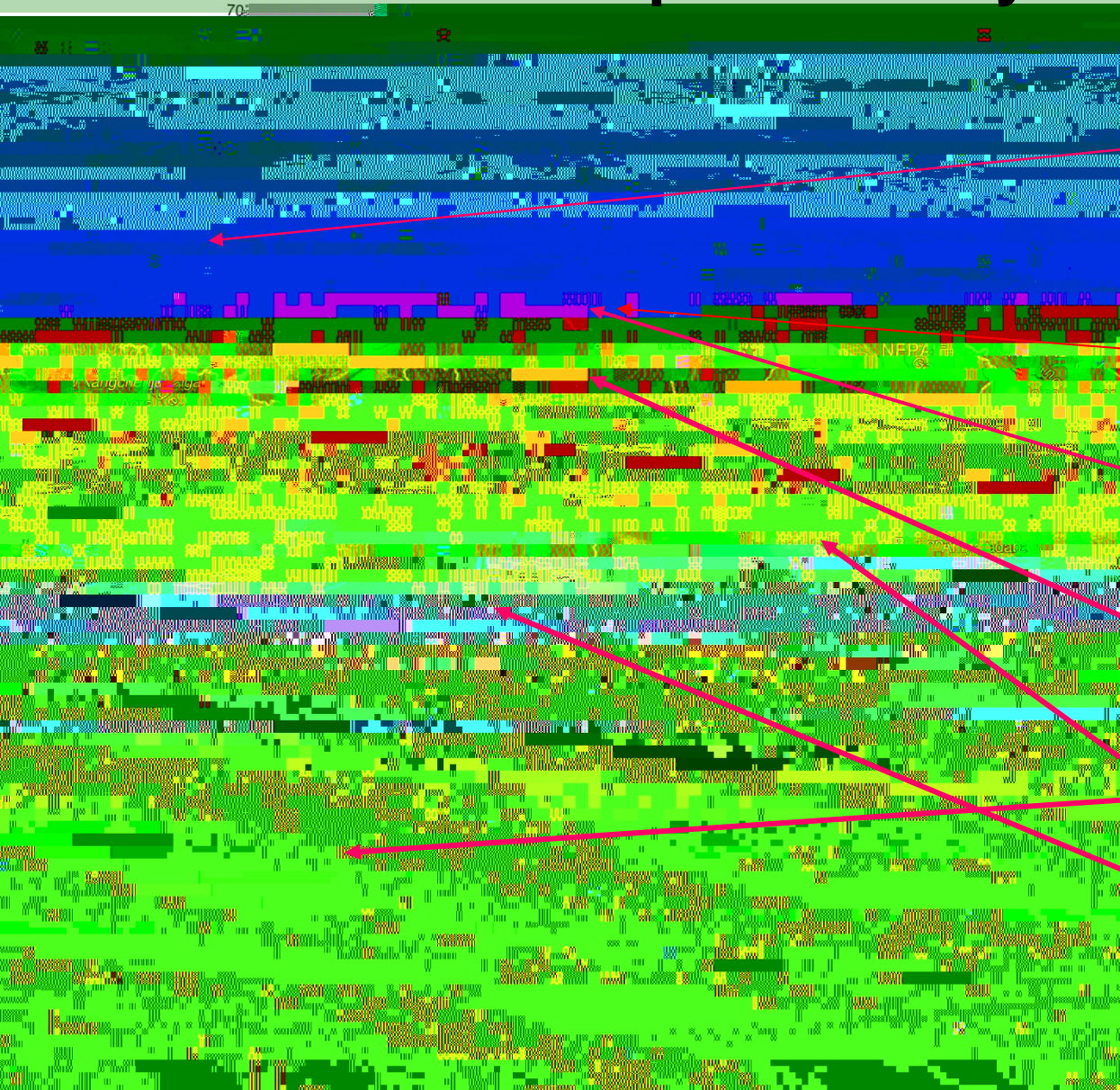
Reviewed South Asian diversity and potential impacts on water

Discussed uncertainty in projections

Mentioned IPCC Himalayan gap

Posed few questions

# The South Asian Region: A hot spot or many hot spots



Arid Zone Pakistan,  
Afghanistan and  
Western India

Himalaya

The Middle Hills

Ganga Plains:

Coastal regions

Deccan Plateau



- ∅ **Untimely Rainfall: Heavy rainfall February damaged all Rabi crops. Also affects drainage system of cities**
- ∅ **Short term heavy rainfall. 350 mm in 6 hours, even 10 mm/hour causes drainage problem and urban flooding. Climate is becoming more erratic. The farmers recognize anomalies.**
- ∅ **Flash floods. common in upland areas of Nepal and India and during monsoon. In Nepal flash flood induced by landslides falling in a river, creating a dam and its breach are common**

Ø Increasing magnitude and frequency of main rivers flooding.

Ø Instances of droughts are frequent. Even during the monsoon rainfall is deficient.

Ø Changes in regional Hydrological systems

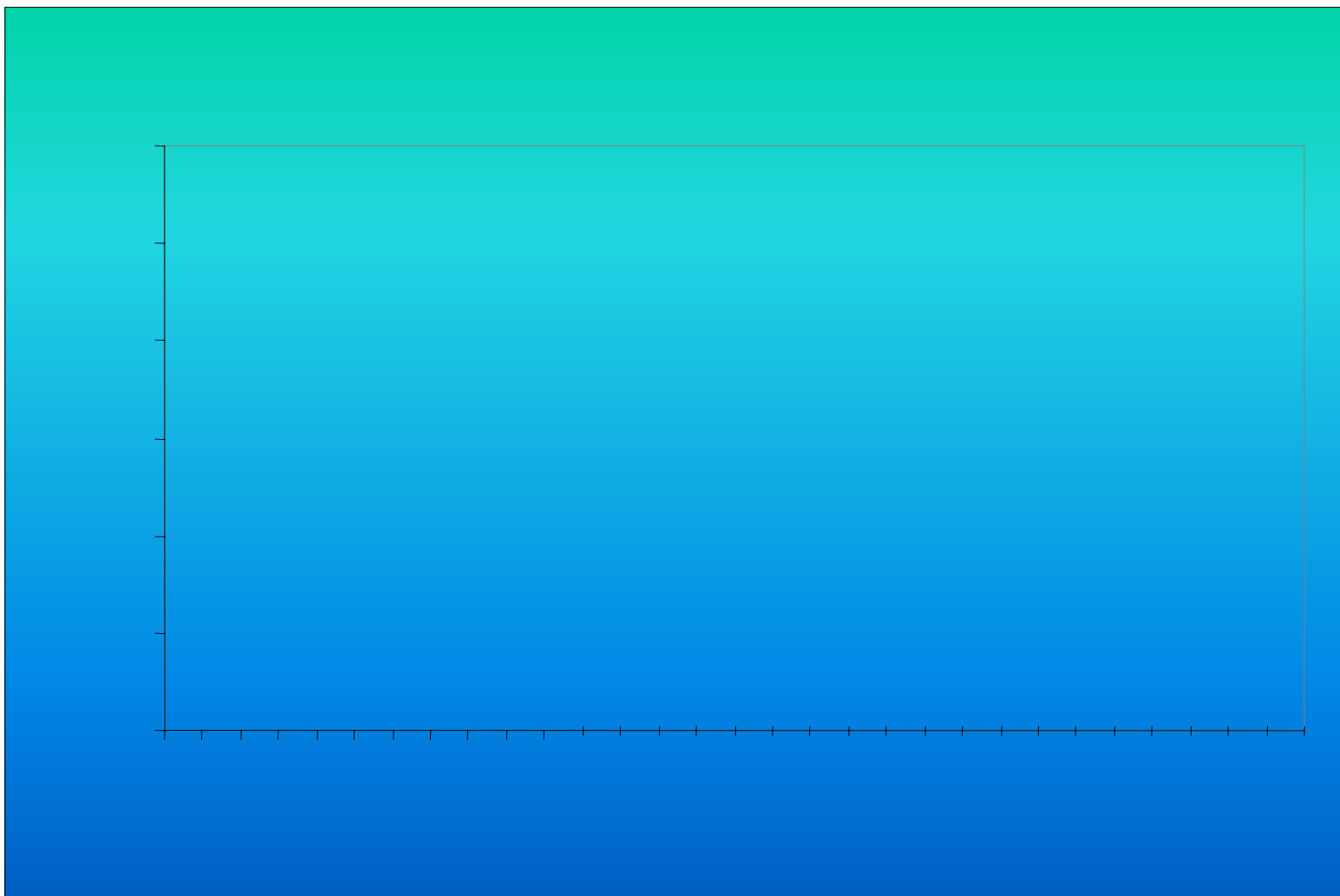


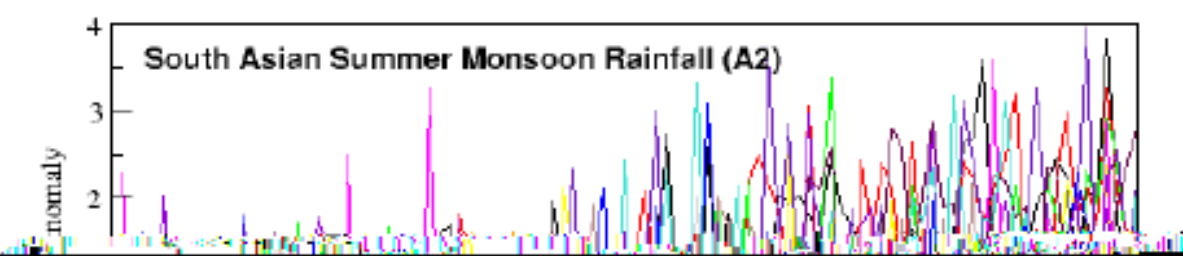
Ø Storm surge/cyclone is increasing.  
It is the energy of storm that is serious.

Ø Sea level rise: increasing salinity

Ø Rise in temperature will affect food production and impact food security







Future scenario for summer monsoon rainfall and annual temperature over south Asia under scenario (high emission) based on AR4 simulation of AOGCMs (anomalies to current period)

*Source Goswami, 2008*

Instead of Indian monsoon being stronger and wetter, there is a potential for monsoon to go to a mega-drought state with high frequency of severe drought through nonlinear feedback within the climate system.

Goswami (2008)

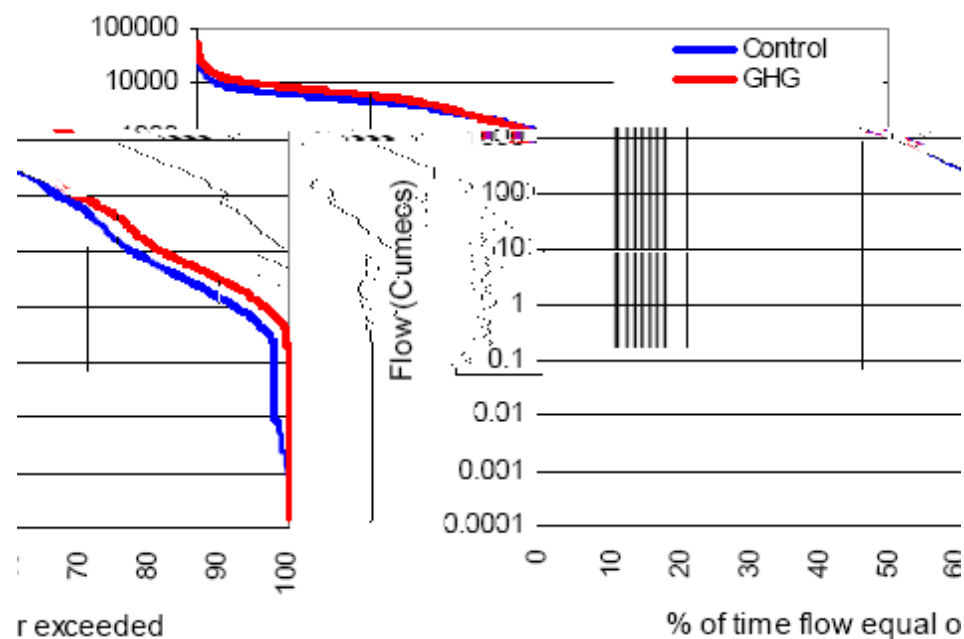
# Meaning

- ∅ Uncertainty in model scenario
- ∅ Confidence in increase in temperature:  
mean, minimum and maximum.

# Scenario development example (after Gosain, 2008)

## Flow Duration Curve For Mahanadi River for Control and CGH scenario

Flow for all the dependable levels has increased for the CGH scenario over the corresponding current flow. For the 50% level of dependability, at which the flow has marginally reduced.



Dependable Flow (cumecs)	25%	50%	75%	90%	PRESENT
4716	1206	15.9	1.468		
6103	1168	43.39	3.182		

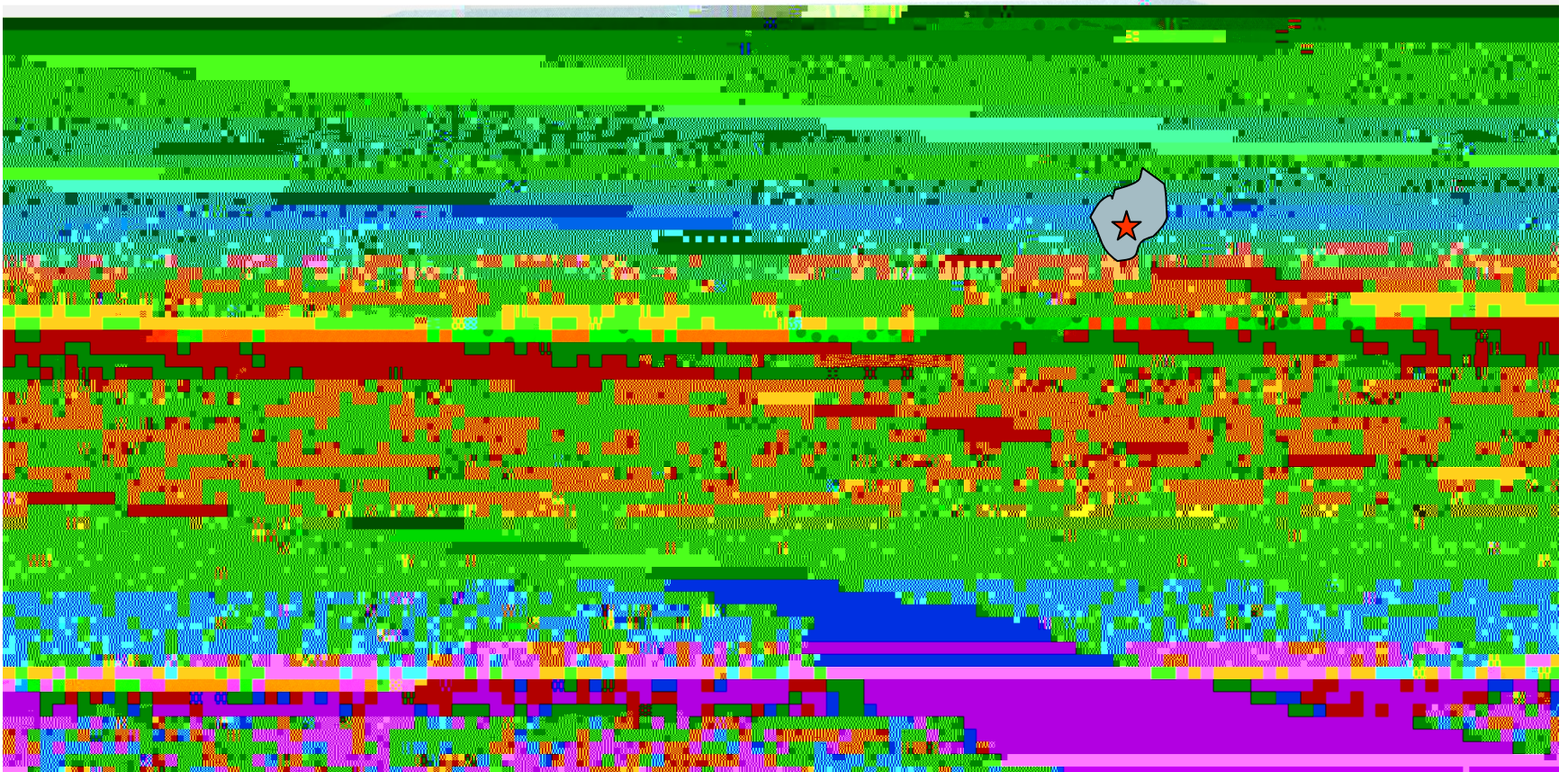
# Three Scenarios for hydrology

One higher river flow

Other dry monsoon

Increased snow melt causes flow to increase then decrease

# IPCC GAP



GCOS Surface Station Network

**What do we do,  
where do we begin and  
how?**



