Presentation on
"Climate Change and its Impacts in South Asia"

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ISAP 2011 Open Session II
Building Resilient Societies

July 26, 2011
Yokohama, Japan

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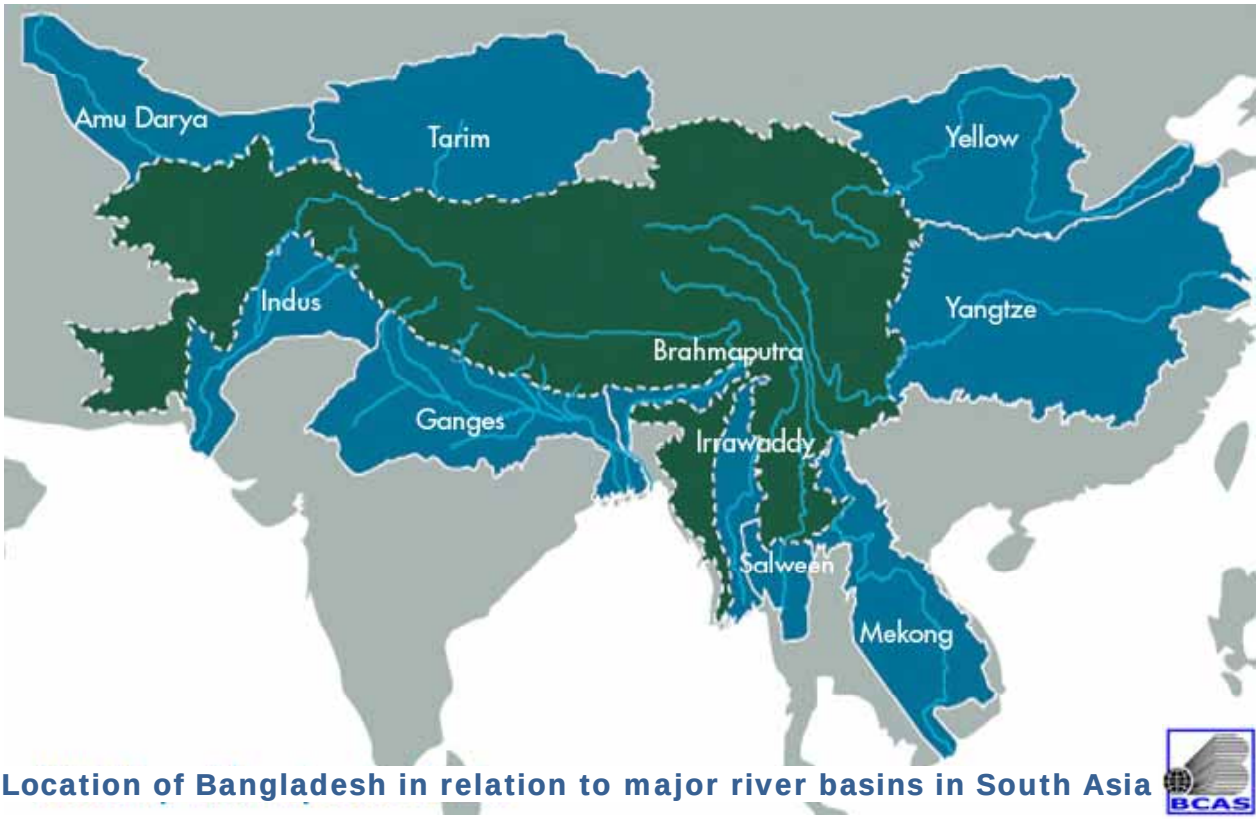
Outline of the discussion

- Physiography of Bangladesh
- How climate change increases disaster risk?
- Changes in frequency of hazard events
  - Flood
  - Drought
  - Cyclone
- Vulnerability to Extreme Climatic Events: A Case study of Bangladesh
- Phases of Disaster Management
- Climate Change-Disaster-Poverty Linkages
- Climate Change-Poverty-MDGs Linkages
- Impact-Vulnerability-Adaptation Relationship
- Poverty - Disaster Hysteresis
- Bangladesh Response

Relief Map of South Asia

http://www.flickr.com/photos/ocean_of_stars/2785428699/sizes/o/in/photostream/

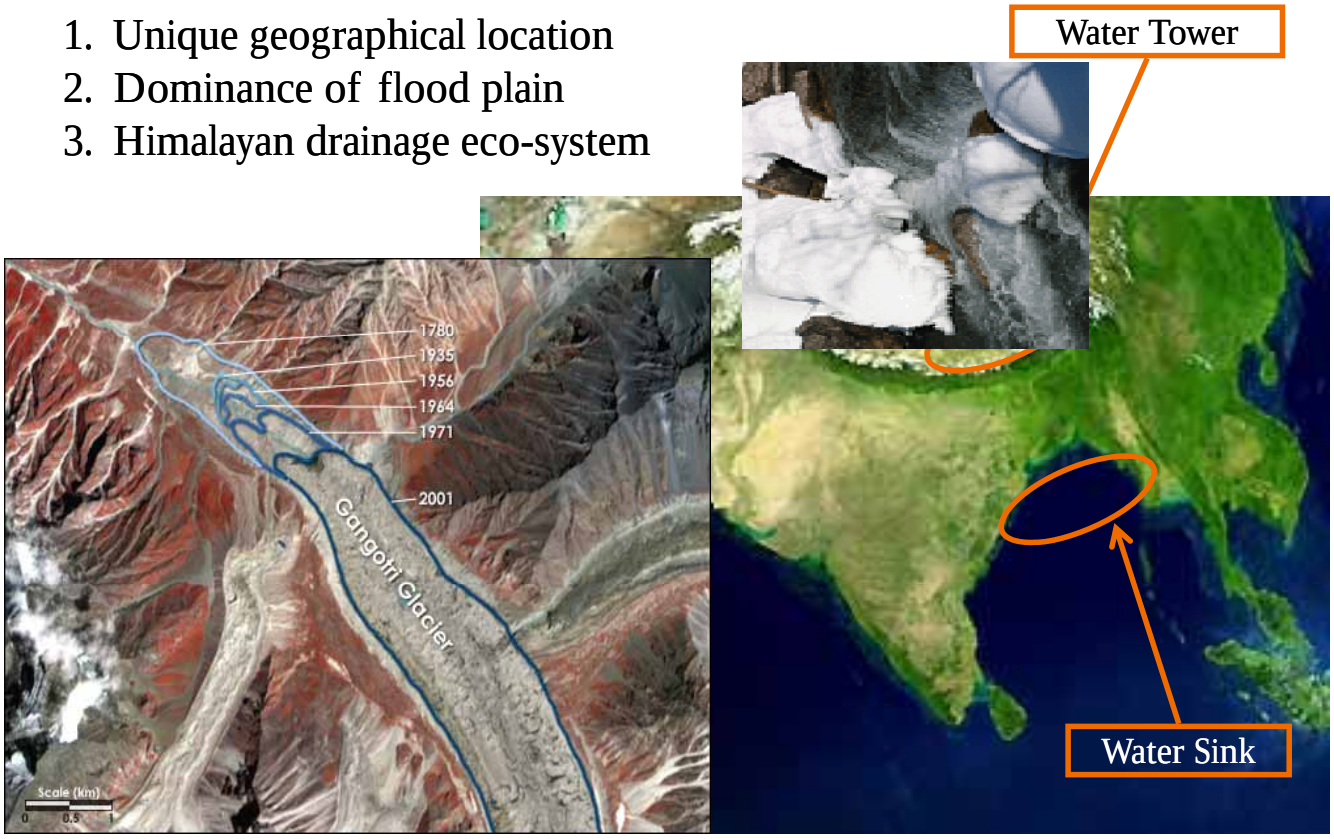
The variability of onset, breaks and duration of the summer monsoon have enormous affects on water resources, agriculture, economics, ecosystems, and human mortality throughout South Asia and Bangladesh as well.



Location of Bangladesh in relation to major river basins in South Asia

The Complex River Systems

1. Unique geographical location
2. Dominance of flood plain
3. Himalayan drainage eco-system



How Climate Change Increases Disaster Risk

- Changes in the magnitude, coverage and frequency of climatic extremes
- Changes average climatic conditions and climate variability, affecting underlying risk factors
- Generates new threats, which a region may have no experience in dealing with.

Vulnerability to Extreme Climatic Events: A Case Study of Bangladesh

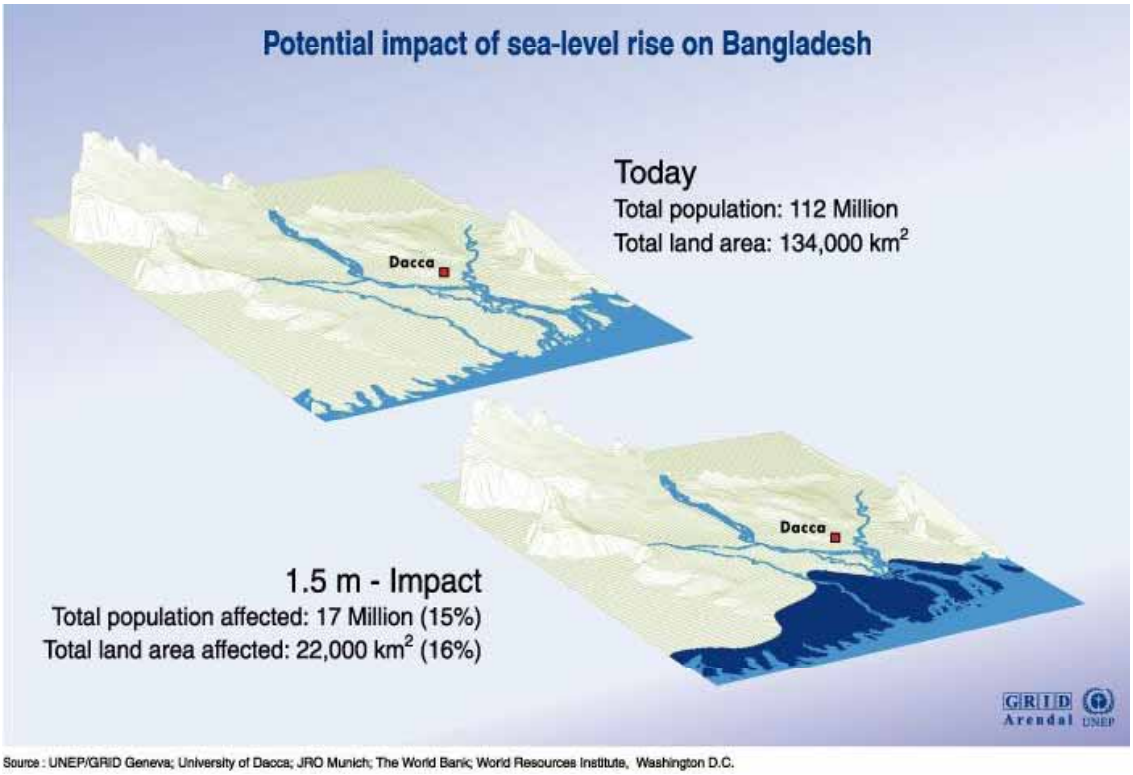
7 major region / hazard based impacts

1. Sea Level Rise
2. Increase of cyclone (Intensity & Frequency)
3. Enhanced intrusion of salt water
4. Increased flood (Intensity & Frequency)
5. Drought
6. River Bank Erosion
7. Erratic Rainfall

These above impacts combined to create 4 generic impacts

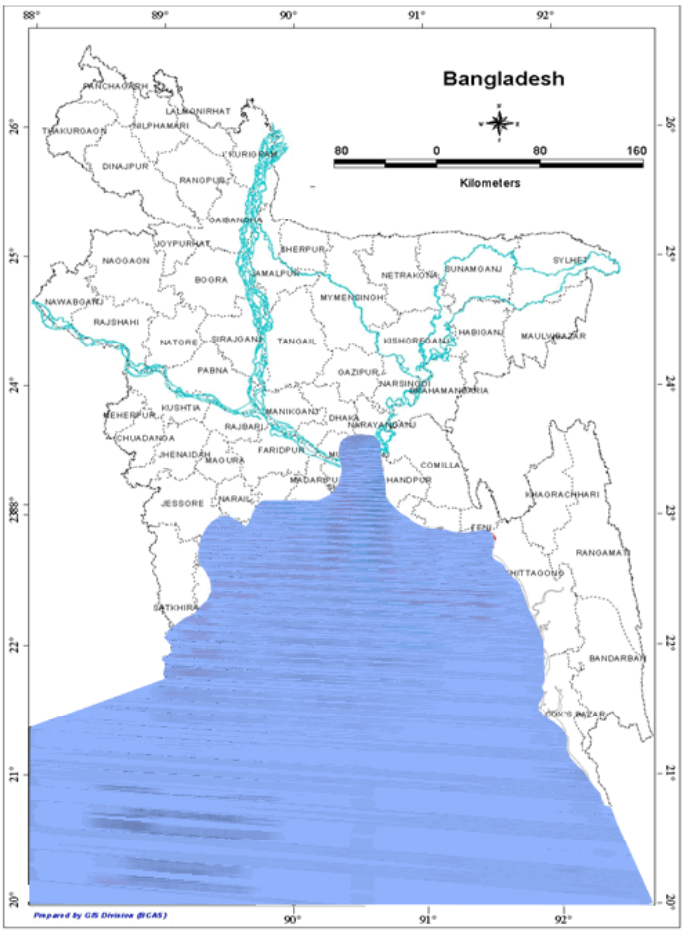
8. Food security
9. Water security
10. Health impacts
11. Displacement and migration

Possible sea level rise and loss of Land in Bangladesh



Source : UNEP/GRID Geneva; University of Dacca; JRO Munich; The World Bank; World Resources Institute, Washington D.C.

1 Meter Sea Level Rise



Sea Level Rise

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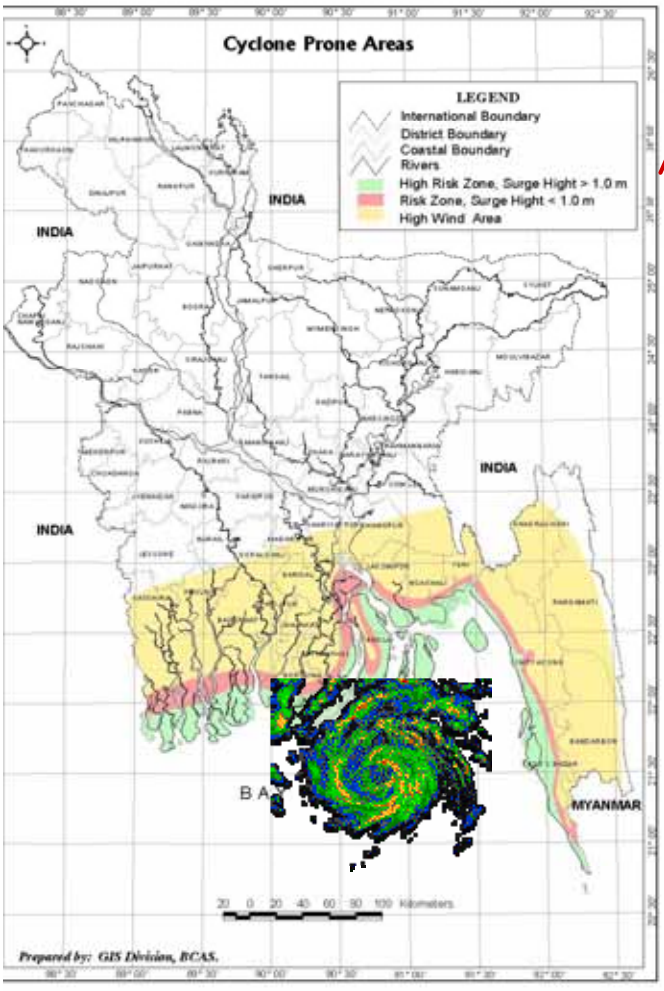
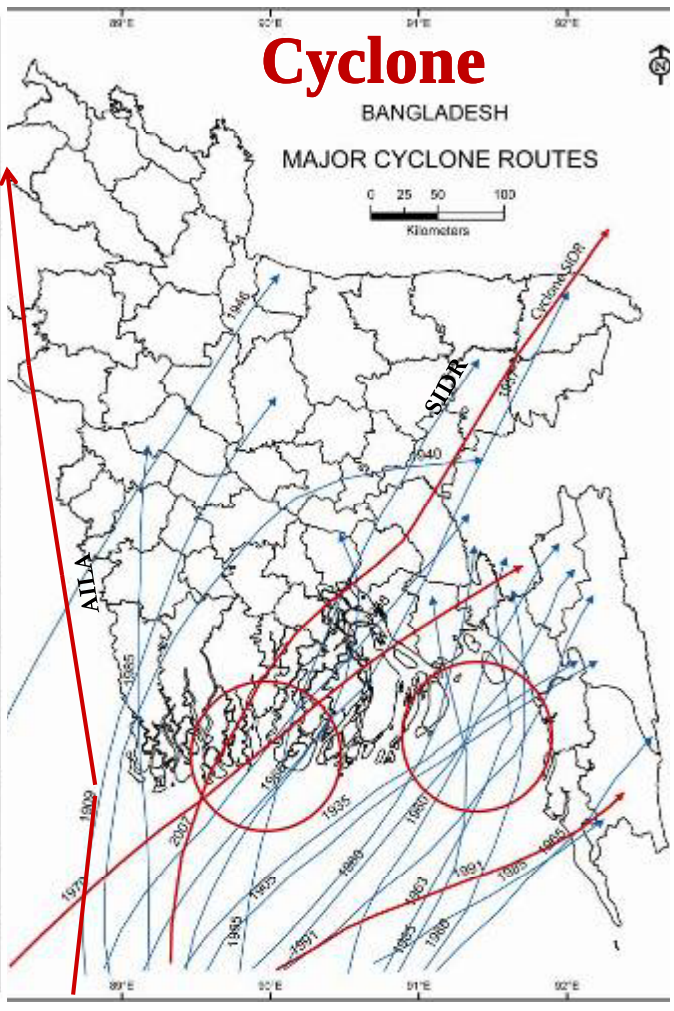
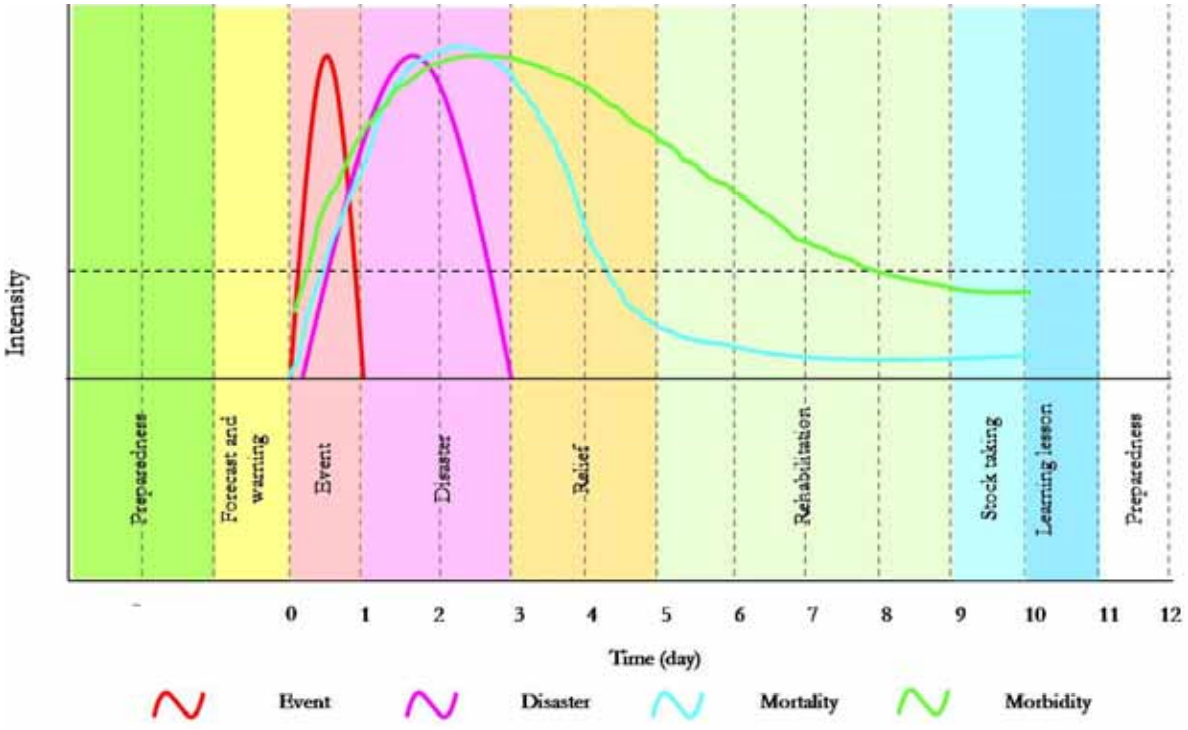
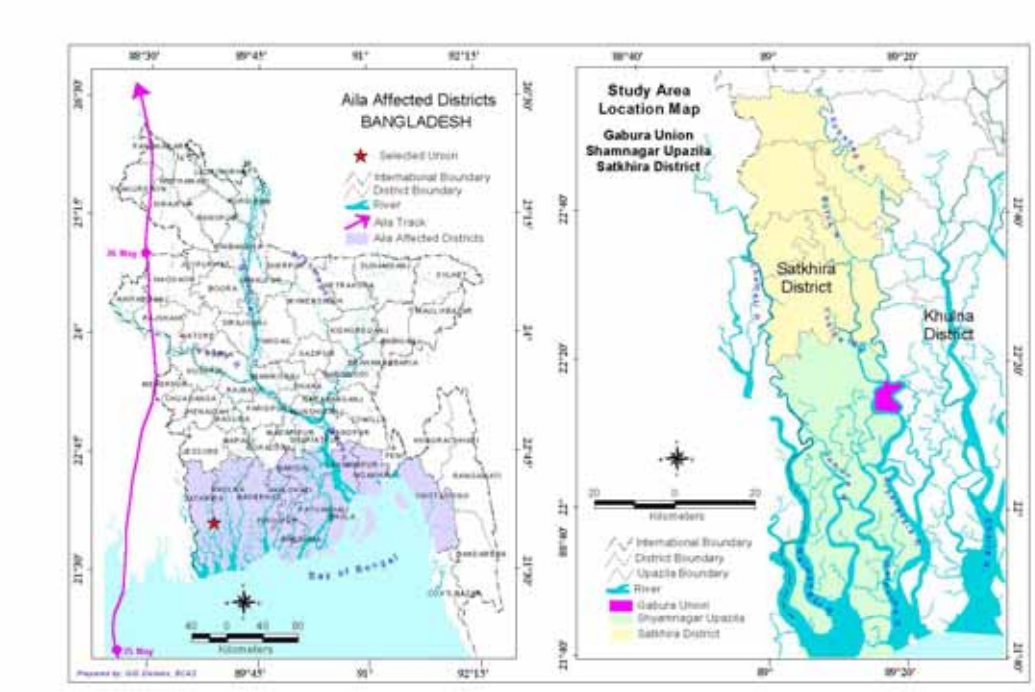




CYCLONE



A case study of AILA



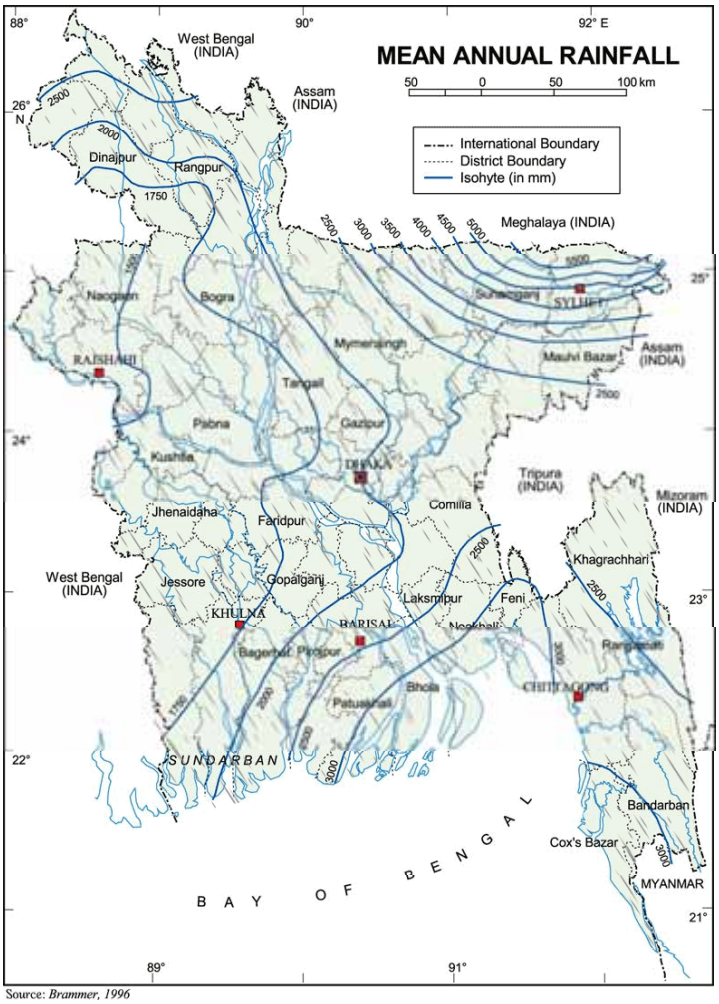
A study was conducted in Gabura Union of Shaymnagar Upazilla under Satkhira District

Damage in Gabura Union

1. Due to Aila, 53 people (11 male and 42 female) were killed,
2. 4,000-5,000 domestic animals were perished,
3. 700 shrimp ghers were destroyed and
4. Embankments and sluice gates were damaged in Gabura union.

Picture 01: Devastation of Aila

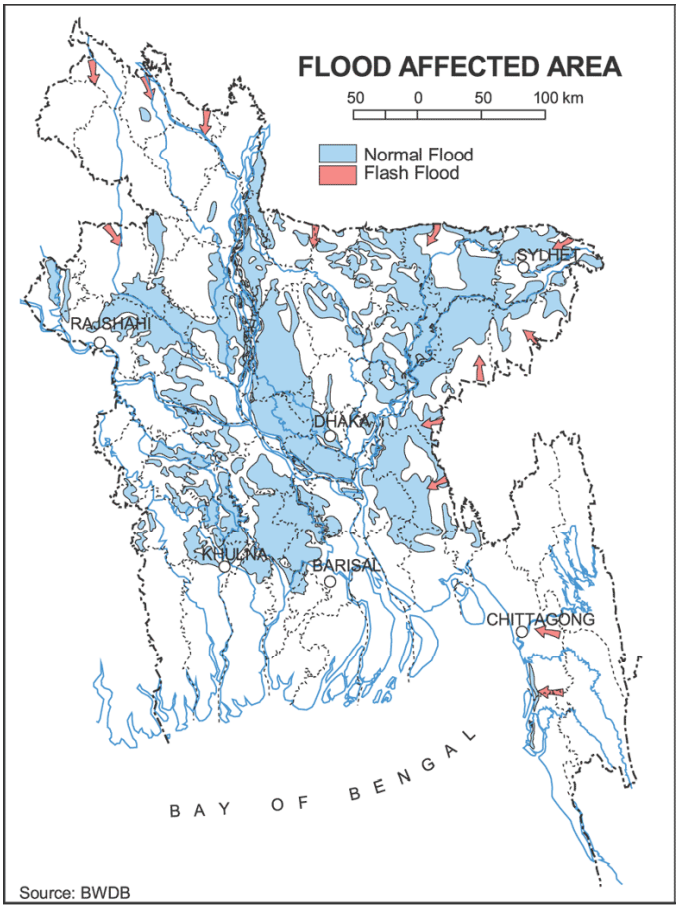
Picture 02: Failure of embankmer

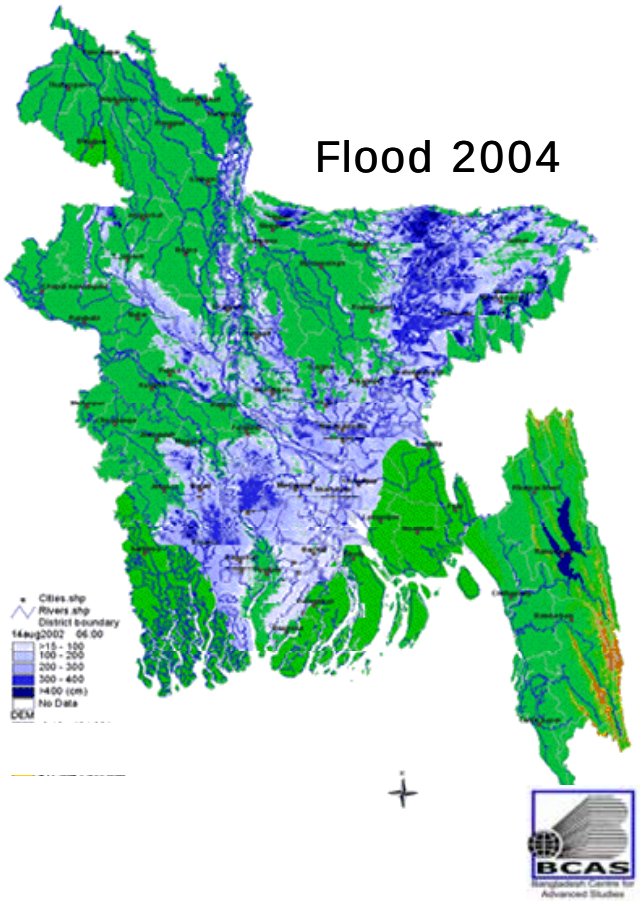


Source: *Brammer, 1996*

Erratic Rainfall

Flood


FLOOD AFFECTED AREA
50 0 50 100 km
Normal Flood
Flash Flood
SYLHET
RAJSHAHI
DHAKA
KHULNA
BARISAL
CHITTAGONG
BAY OF BENGAL
Source: BWDB


Flood 2004
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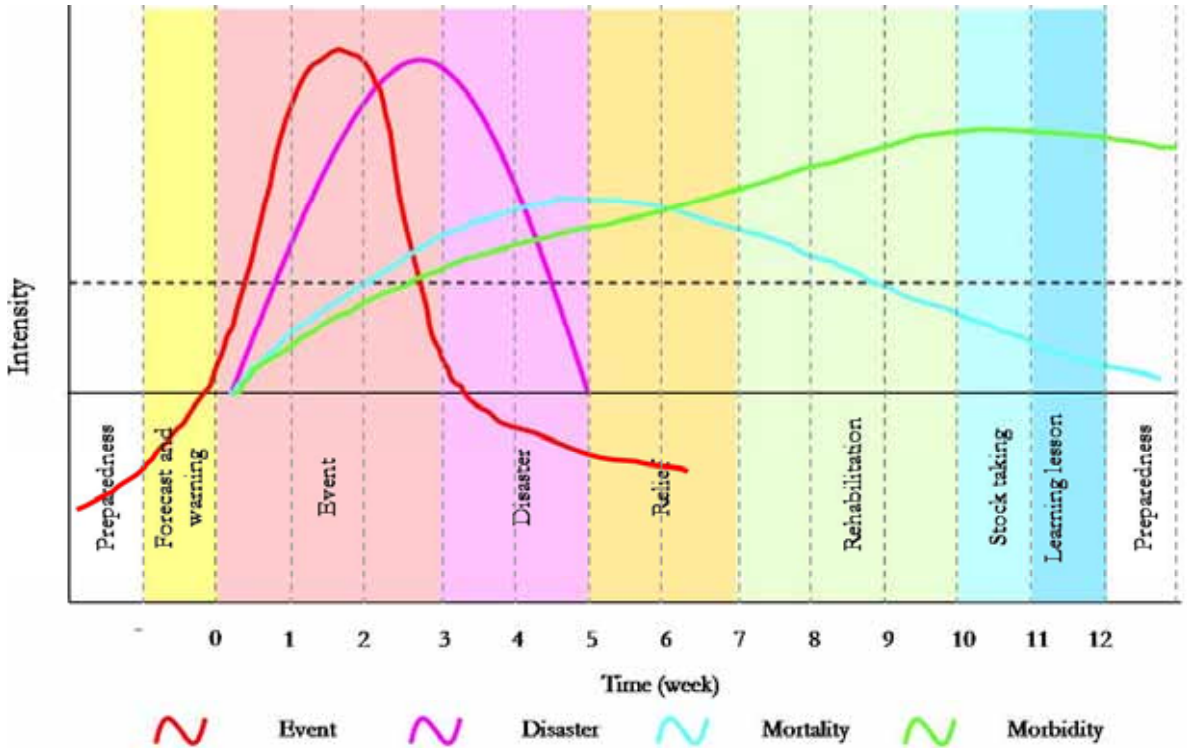
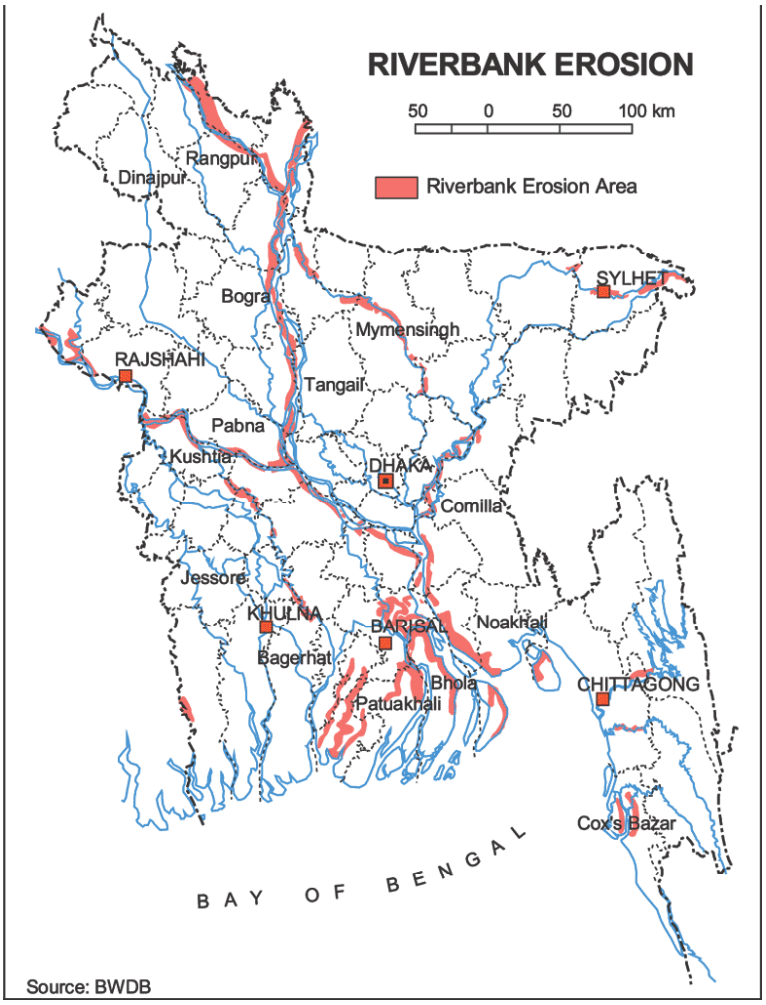
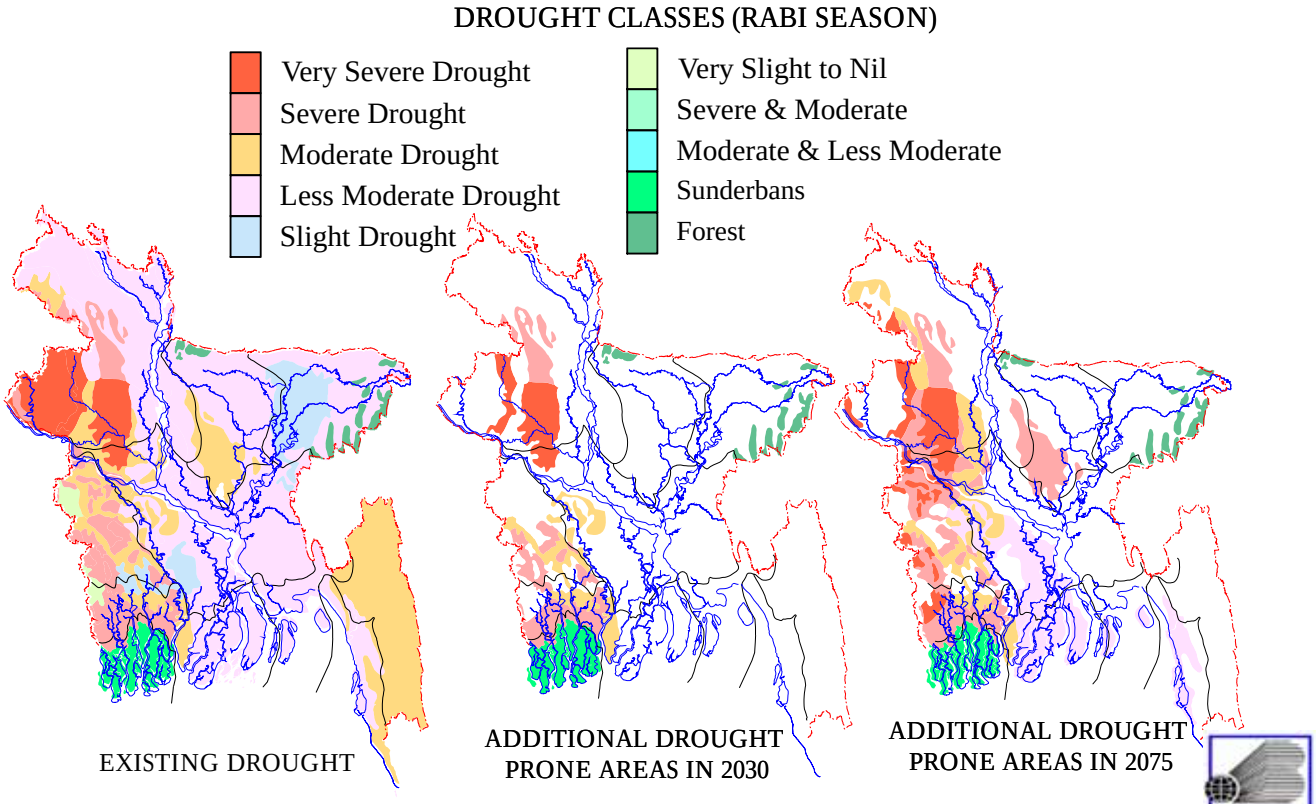
FLOOD


Intensity
Preparedness
Forecast and warning
Event
Disaster
Relief
Rehabilitation
Stock taking
Learning lesson
Preparedness
0 1 2 3 4 5 6 7 8 9 10 11 12
Time (week)
Event
Disaster
Mortality
Morbidity

River Bank Erosion

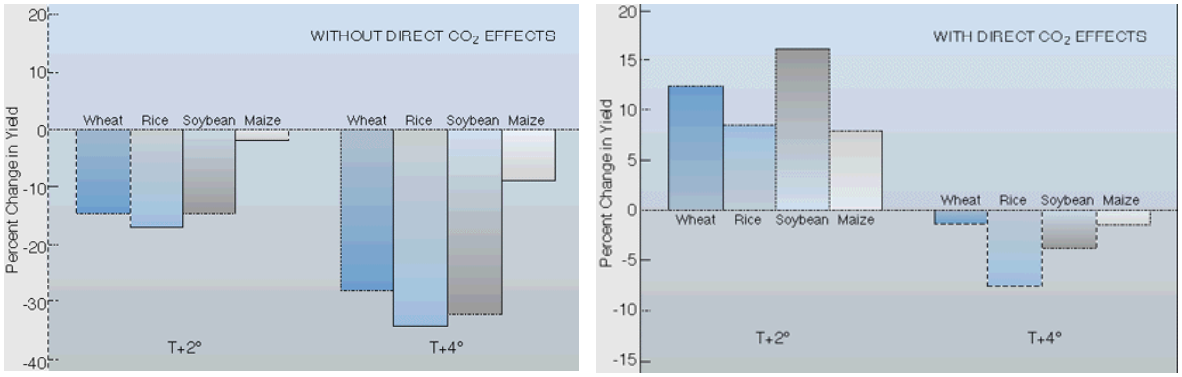


EXISTING DROUGHT SITUATION, AND DROUGHT SITUATION IN THE YEARS 2030 & 2075



Food Security

- IPCC estimates that, by 2050, rice production in Bangladesh could decline by 8 percent and wheat by 32 percent



- Decrease production of livestock
- Increase of pest attack
- Decrease production of fisheries

Health

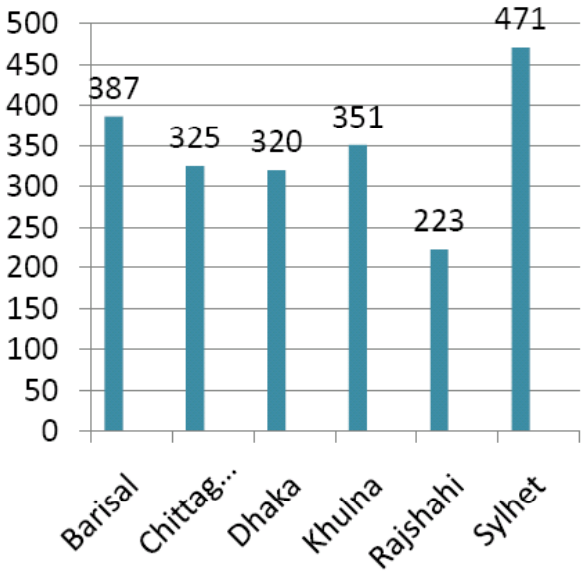
Negative impact	Positive impact
Very high confidence	
Malaria: contraction and expansion, changes in transmission season	
High confidence	
Increase in malnutrition	
Increase in the number of people suffering from deaths, disease and injuries from extreme weather events	
Increase in the frequency of cardio-respiratory diseases from changes in air quality	
Change in the range of infectious disease vectors	
Reduction of cold-related deaths	
Medium confidence	
Increase in the burden of diarrhoeal diseases	

Source: IPCC AR4, 2007

Impact of Climate Change on pregnant women

- 12,000 women die each year due to pregnancy complications & unsafe delivery (graph)
- We looked at how Climate Change induced salinty affects pregnant women in the coastal areas.

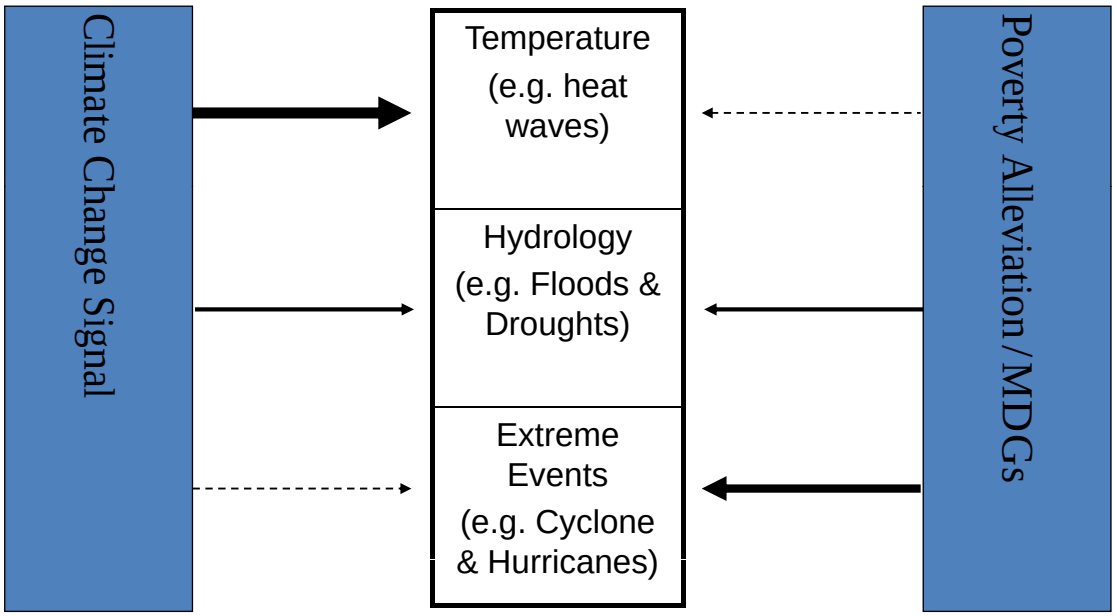
Maternal Mortality Ratio by Division (2001)



Hypertension, preeclampsia, eclampsia among pregnant women (diagnosed at 20 weeks to 40 weeks)from last 5 years

Years	Total Pregnancy	Hypertension	Preeclampsia	Eclampsia
2005	370	4	28	26
2006	835	14	32	15
2007	799	2	3	32
2008	432	0	25	10
2009	552	0	41	11

Climate Change, Poverty and MDGs Linkages



Source: Saleem et al.., 2006

Impact-Vulnerability-Adaptation: Relationship

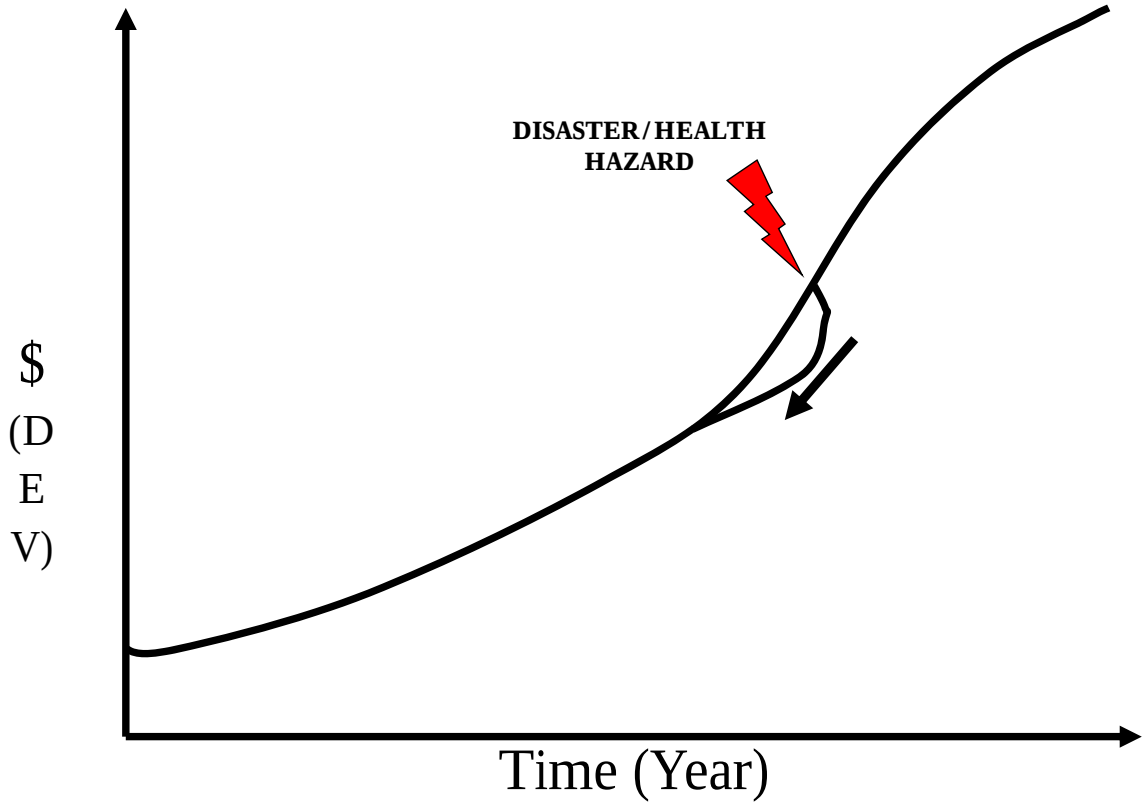
$$\text{Impact Event} = \sum \int \text{Intensity of Event} \; X \int \text{Baseline Conditions} \; X \int \text{Adaptive Capacity}$$

WHY POVERTY IS A CONCERN?

"Cyclone is not the only disaster – poverty is the main disaster" ……..

…….Dr. M. Yunus, (Cyclone 91, BCAS)

Schematic Diagram Showing Severe Impact of Disaster and Health Hazards on Poverty and SD



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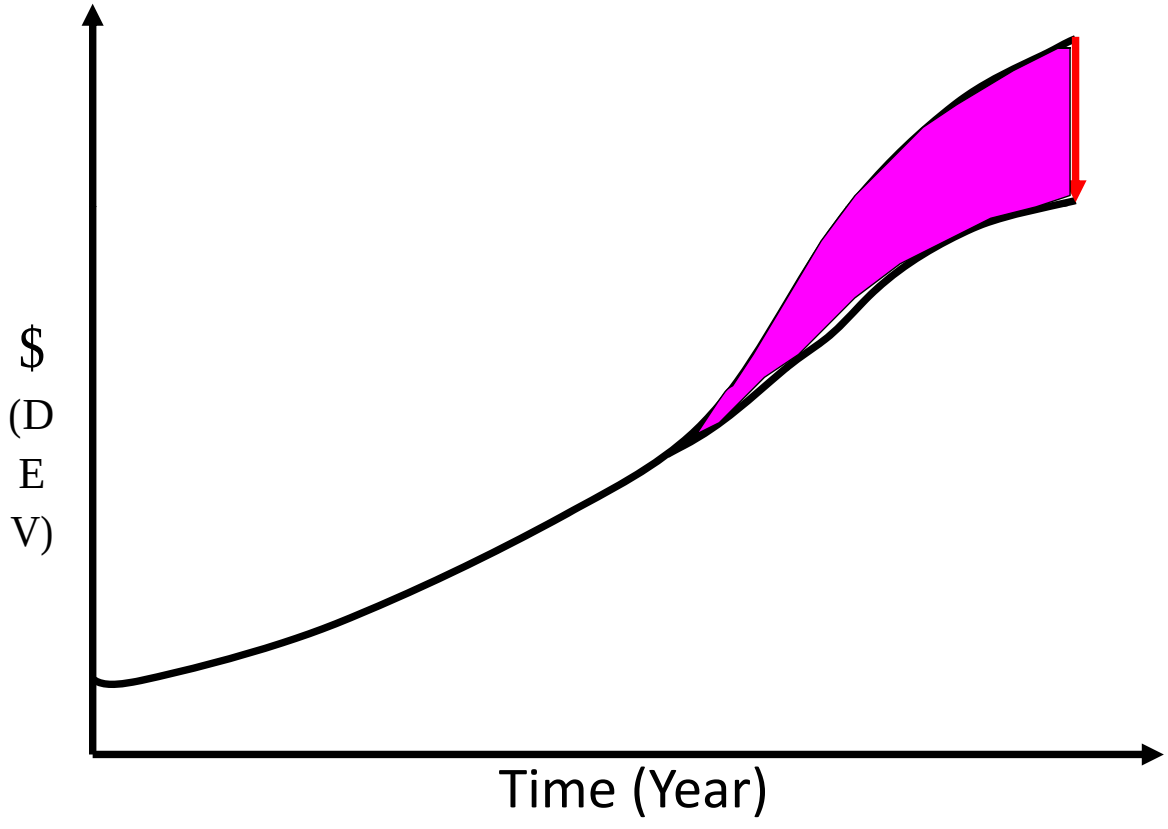
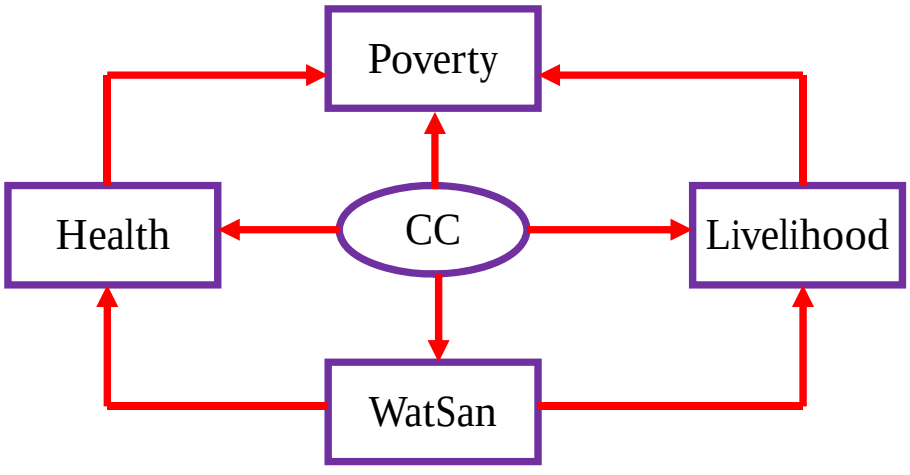


CC-WatSan-Health-Livelihood-Poverty

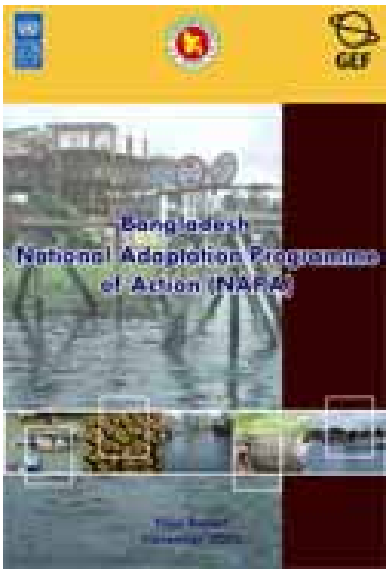


60-70% global impacts of climate change can be reflected in water. This is:

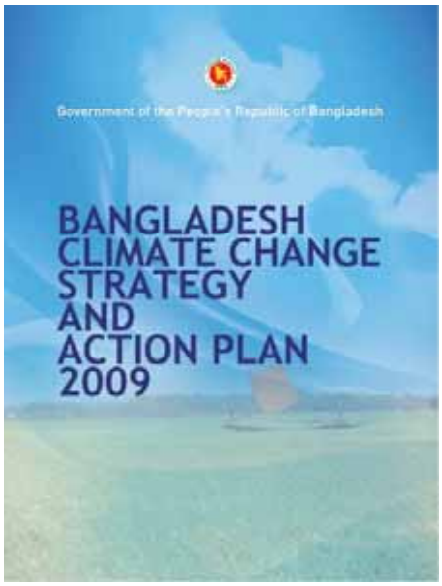
a. Too much water
b. Too little water
c. Wrong type of water
d. Wrong timing of water

Bangladesh Response to Climate Change

NAPA



BCCSAP



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SIX PILLARS of Bangladesh Climate Change Strategy and Action Plan (BCCSAP)

(1) Food Security, Social Protection and Health;
(2) Comprehensive Disaster Management;
(3) Infrastructure Development;
(4) Research and Knowledge Management;
(5) Mitigation and low-carbon development; and
(6) Capacity Building and Institutional Development

The Action Plan consists of 44 programmes and 145 projects for implementation within the time period of 2009-2018. BCCSAP will be an integral part of national development policies, plans and programmes.

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Key elements of BCCSAP Pillar 4: Research and Knowledge Management

- To predict the likely scale and timing of climate change impacts on different sectors of the economy and socioeconomic groups,
- To underpin future investment strategies,
- To ensure that Bangladesh is networked into the latest global thinking on climate change.

Bangladesh Response to Climate Change

Two funds mobilized

- Government of Bangladesh established **Climate Change Trust Fund: $100 million/year** and implementing projects for last two financial years
- **Multi-Donor Trust Fund of Bangladesh: in progress. To date MDTF received a commitment of over $130 million from UK, Denmark, Sweden and European Commission;**
- **NGOs and civil societies are working with people to understand the local level issues and implementing adaptation projects**
- **Over the last 35 years, the GoB invested over US$10 billion to make the country less vulnerable to natural disasters;**
- **Until recently, Bangladesh chaired the LDC group in the international climate change negotiations and remains a strong LDC voice in it speaking on behalf of vulnerable countries**

Differential responses of different economic groups

- **Rich: affected but can manage**
  - Defence
  - Migrate
  - Food Stock
  - Ensure health support: safe drinking water, sanitation
- **Middle: Marginally managed the event**
  - Most of the above
- **Lower middle class: Sufferings are high**
  - Very little defence
  - Hesitate to migrate: A taboo
  - Food shortage
  - Health and sanitation problems
  - Eliminate all savings
  - Look for informal financial support and relief
- **Poor: most vulnerable and eats way it savings**
  - Similar to lower middle class but migrates to shelters if available
  - Severe health impacts
  - Total dependence on external food
  - Uncertain future
  - Looking for employment

Peoples response

PEOPLE'S ADAPTATION

ADAPTATION IS HAPPENING

- ❑ **Climate Change is here and now.**
- ❑ **Communities across the world facing impacts and adapting.**
- ❑ **Some are adapting in the fullest knowledge of CC impacts**
- ❑ **Others are adapting intuitively / experientially**

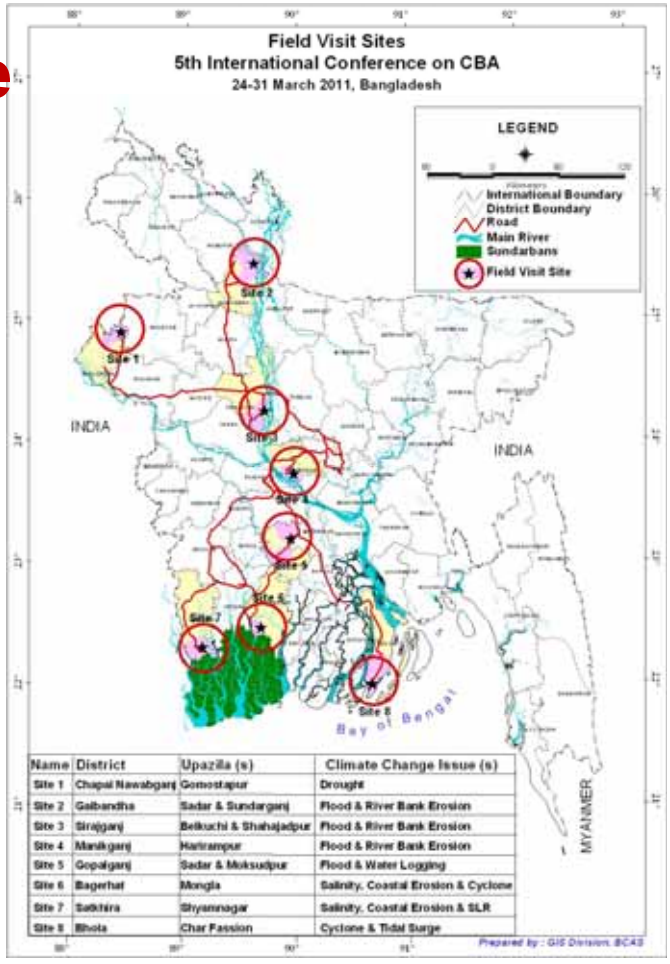
Peoples response

Conclusion

- Bangladesh: Most vulnerable country
- Early leadership in Research on Adaptation and Disaster Risk Reduction
- Initial initiatives by Think-Tanks and NGOs. Gradual increased involvement of Government Agencies
- NAPA, BCCSAP – Key recognized documents
- Early initiatives in quality research
- Key organization linking with international initiatives.

Peoples response

Participants to the 5th International Conference on CBA (Community Based Adaptation) visited sites



Name	District	Upazila (s)	Climate Change Issue (s)
Site 1	Chapai Nawabganj	Gomostapur	Drought
Site 2	Gaibandha	Sadar & Sundarganj	Flood & River Bank Erosion
Site 3	Sirajganj	Belkuchi & Shahajadpur	Flood & River Bank Erosion
Site 4	Manikganj	Harirampur	Flood & River Bank Erosion
Site 5	Gopalganj	Sadar & Moksudpur	Flood & Water Logging
Site 6	Bagerhat	Mongla	Salinity, Coastal Erosion & Cyclone
Site 7	Satkhira	Shyamnagar	Salinity, Coastal Erosion & SLR
Site 8	Bhola	Char Fassion	Cyclone & Tidal Surge

Prepared by : GIS Division, BCAS

Raised Plinth Height

Source: Char Livelihood Program of DFID

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Homestead Garden on Raised Plinth

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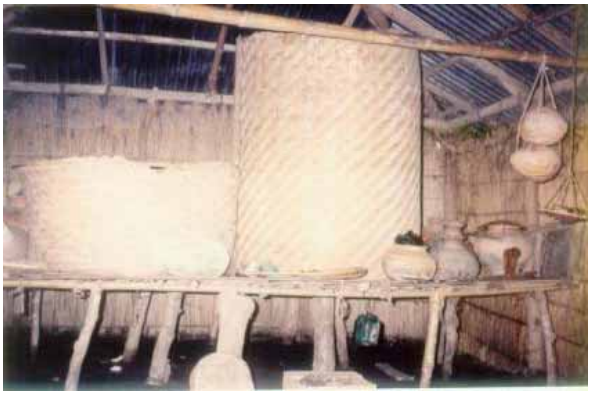
Raised Plinth of Toilet

Livestock During Flood

Raising Plinth

Preservation of Household Assets Over False Ceiling



Storage of Food during Flood

Storage of Safe Drinking Water & Dry Food

Community based rain water harvesting

Household based rain water harvesting

Floating Garden During Flood

Locally Known as Baira Cultivation

Raised Tube Well

Store Extra Furnace

Protecting from Erosion

Protecting Income Generating Activity

Water Collection in Hilly Region

Community People Using the Water of Re-excavated Pond

Pond Sand Filter

Household Based Rain Water Harvesting in Drought Prone Area

Drip Irrigation

Household Based Irrigation Farming

Crab Farming in Saline Water

Saline Tolerant Rice

Chickpeas in Drought Area

Local Adaptation Practices in Nepal

Seed storage system/seed bank

THANK YOU