

Impacts of Climate Change in Water and Agriculture in Bangladesh

Presented by

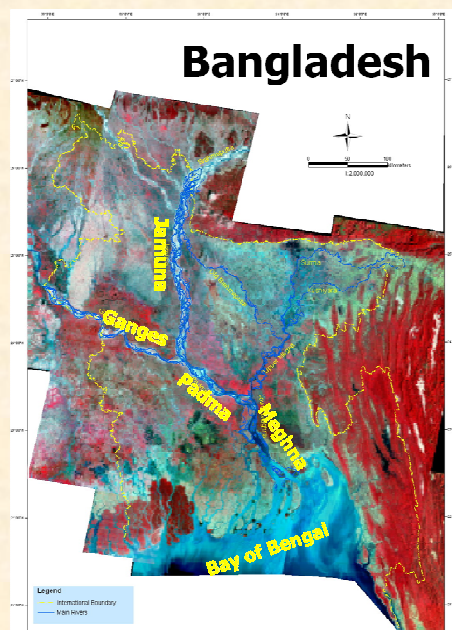
Dr. Maminul Haque Sarker

CEGIS

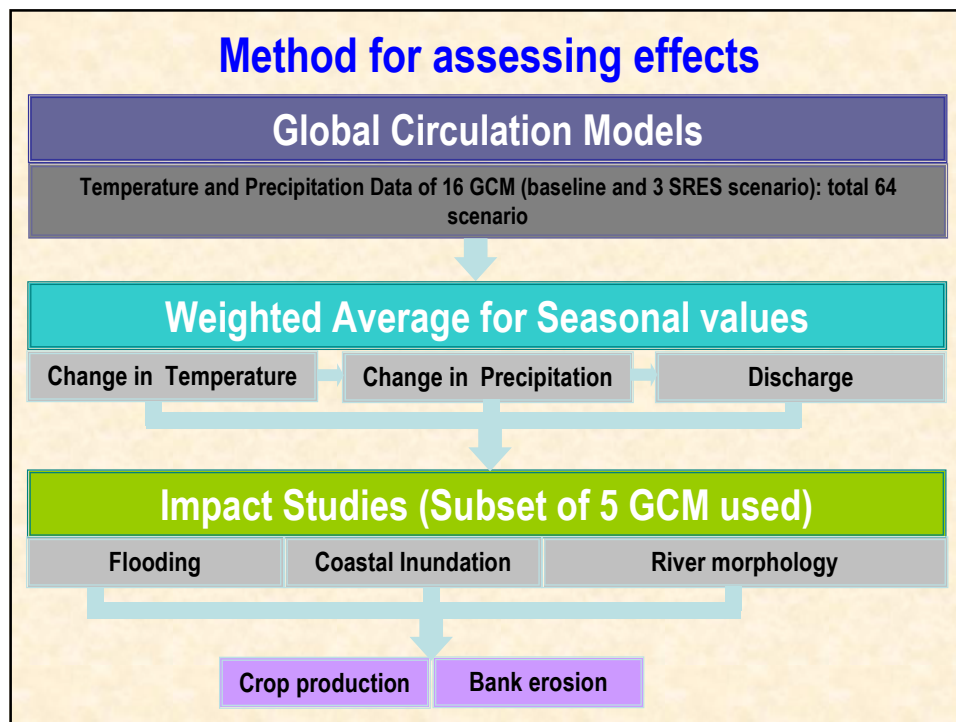
Bangladesh

Date: September 30, 2010

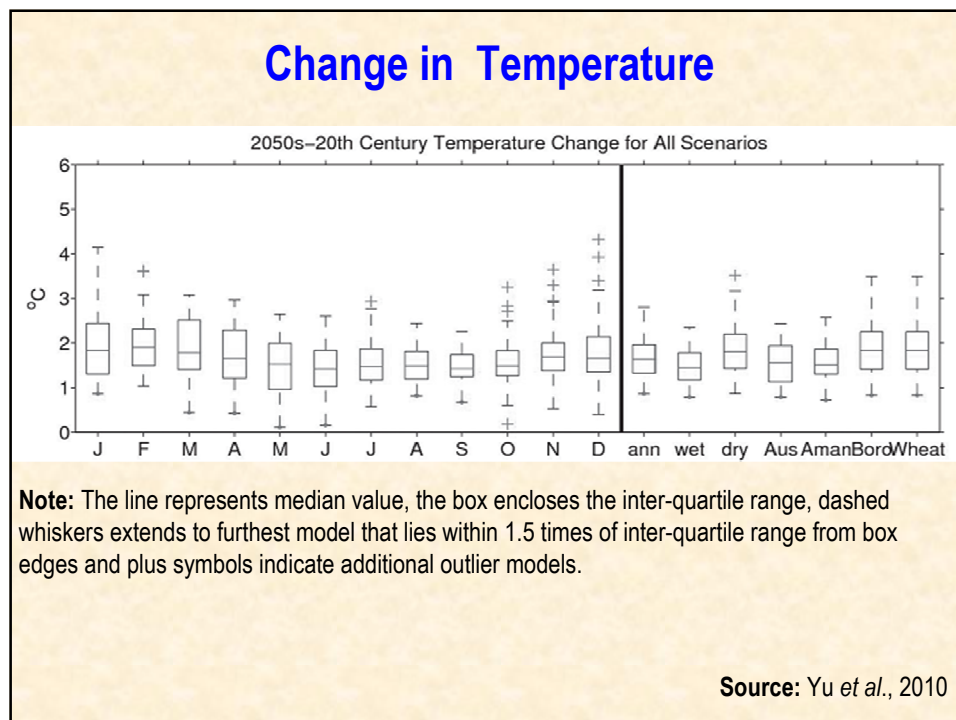
Major rivers of Bangladesh



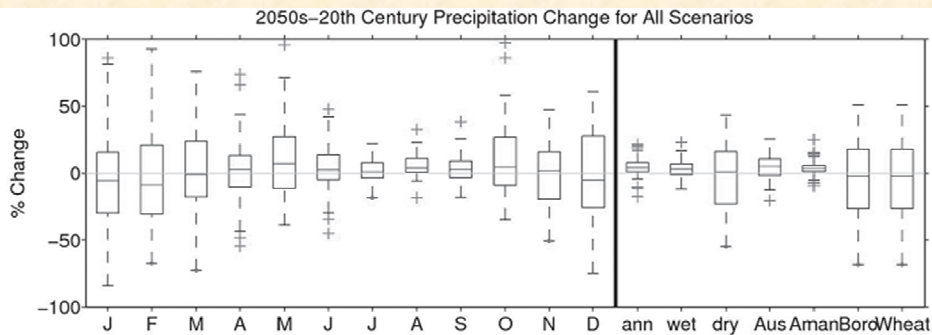
Method for assessing effects



Change in Temperature



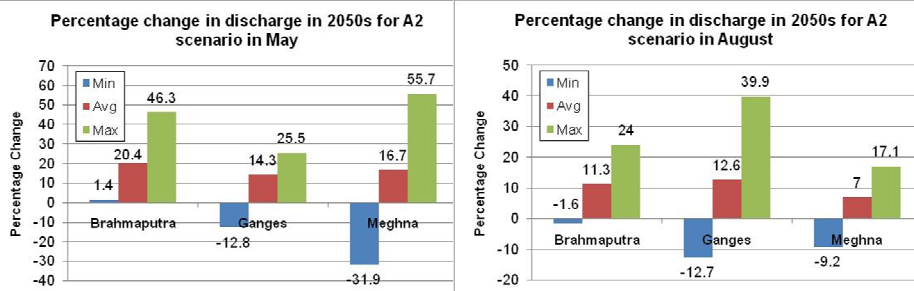
Changes in Precipitation



Note: The line represents median value, the box encloses the inter-quartile range, dashed whiskers extends to furthest model that lies within 1.5 times of inter-quartile range from box edges and plus symbols indicate additional outlier models.

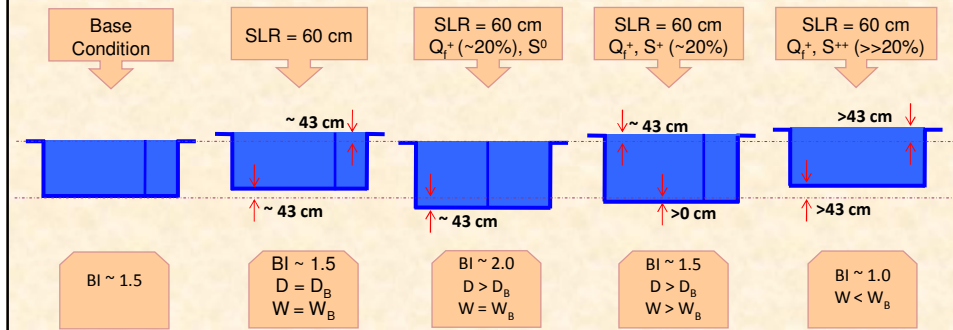
Source: Yu *et al.*, 2010

Changes in discharge



Source: Yu *et al.*, 2010

Change in River Morphology



Note: BI = Braiding Intensity, W_B = Base Width, D_B = Base Depth

Impact on river bank erosion

Predicted riverbank erosion along the Jamuna, Ganges and Padma Rivers for the increase of flood discharge by 20% in the next 100 years.

Loss of land per year:

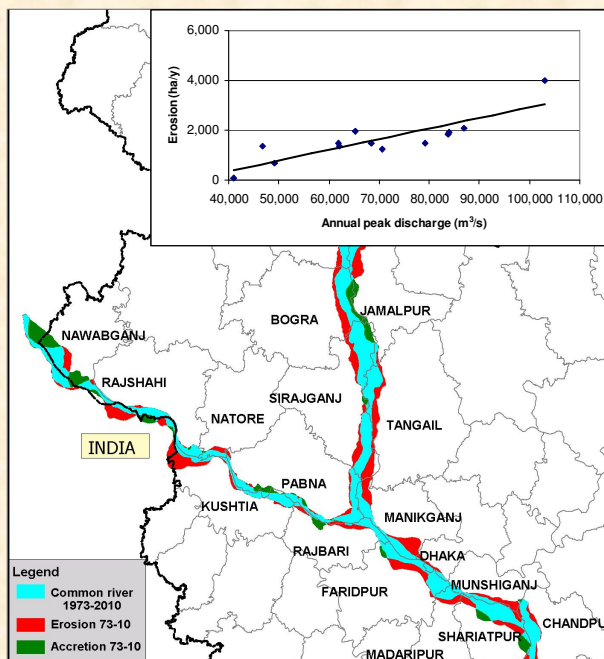
Base Condition = 6,000 ha
After 50 years = 6,600 ha
After 100 years = 7,200 ha

Loss of settlement per year:

Base Condition = 410 ha
After 50 years = 440 ha
After 100 years = 485 ha

Shelterless and landless people per year:

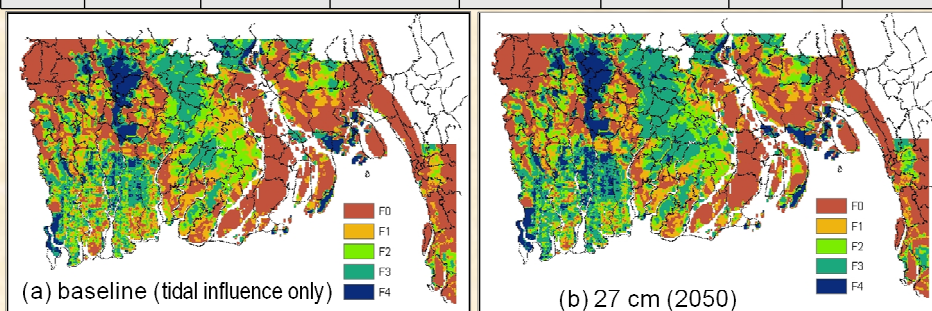
Base Condition = 68,520
After 50 years = 101,970 (yr 2050)



Impact on sea level rise

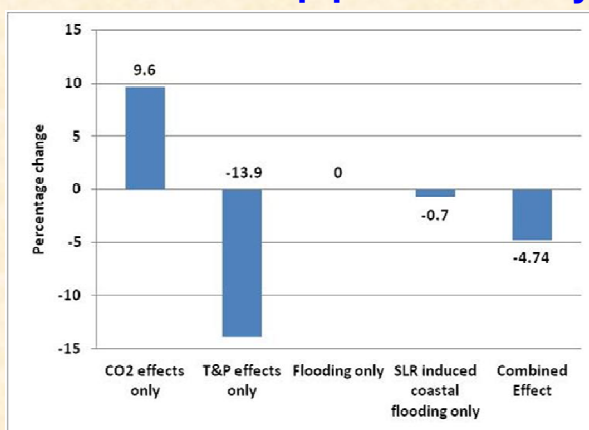
Sea level rise impacts on flood depths in coastal area

Area (ha)	F0 (0-30 cm)	F1 (30-60 cm)	F2 (60-90 cm)	F3 (90-180 cm)	F4 (180 + cm)	Flooded Area (F1+F2+F3+F4)	% of total
Base	15,920	4,753	4,517	5,899	1,759	16,928	52
27 cm	14,189	4,345	4,488	7,456	2,370	18,659	57



Source: IWM & CEGIS, 2007; reproduced in Yu et al., 2010

Impacts on Boro crop production by 2050

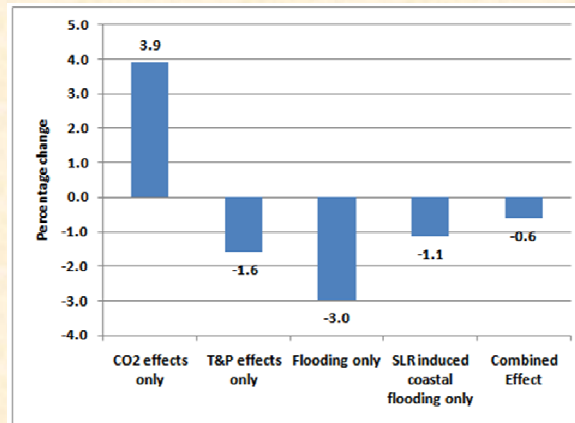


Median integrated production change (%) of Boro for 2050

A2 scenario	B1 scenario	All SRES scenario
-5.54	-3.54	-4.74

Source: Yu et al., 2010

Impacts on Aman crop production by 2050



Median integrated production change (%) of Aman for 2050

A2 scenario	B1 scenario	All SRES scenario
-1.49	-0.4	-0.62

Source: Yu *et al.*, 2010

Summary

This impact estimate on water and agriculture is based on global downscaling and also the river bank erosion is mainly based on the discharge and morphological responses of the river.

- River bank erosion will be increased due to climate change. Increase of erosion vulnerable people will be 50% by 2050
- Considerable losses of national assets and income are expected due to river bank erosion in three major rivers.
- The median of all rice crop projections for 2050 show declining national production. Overall reduction in aman and boro production is 0.6% and 4.7% respectively.
- Climate change exacerbates the negative impacts of existing climate variability by further reducing rice production by a projected cumulative total of 80Mt over 2005–50 (about 3.9 percent/year), driven primarily by reduced boro crop production.

Adaptations

- River training and bank protection works
- Raising the height of the coastal embankment
- Enhance irrigation efficiency and overall land productivity
- Improving crop productivity: greater agricultural research and development
- Instead of lateral extension of the delta, vertical extension would be a good strategy for adaptations

Thank You All