



Contents of Presentation

- Vulnerability of Bangladesh to Climate Change
- Objective
- Approach and Methodology
- Assessment of Impact
- Limitation of the Assessment
- Conclusions

INSTITUTE OF WATER MODELLING
I W M



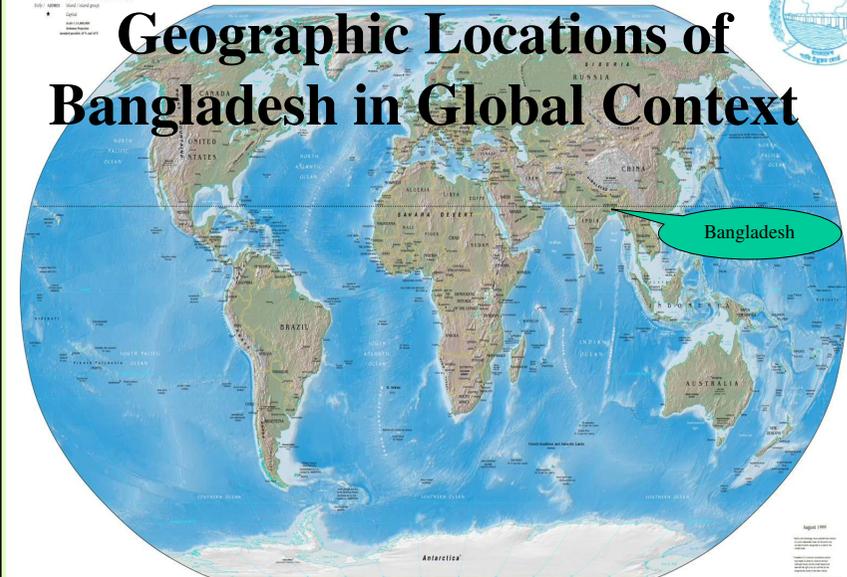
Vulnerability of Bangladesh to Sea Level Rise

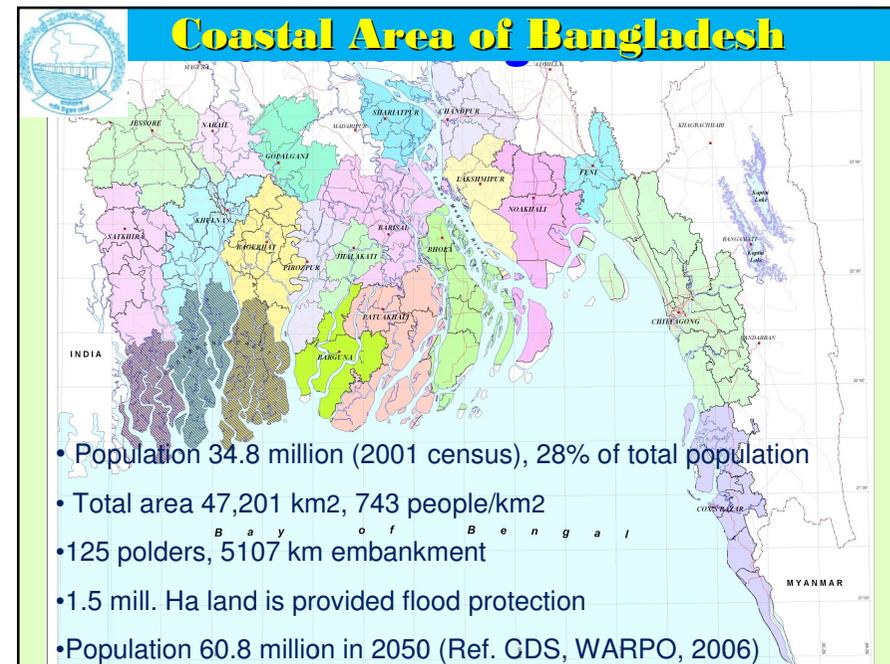
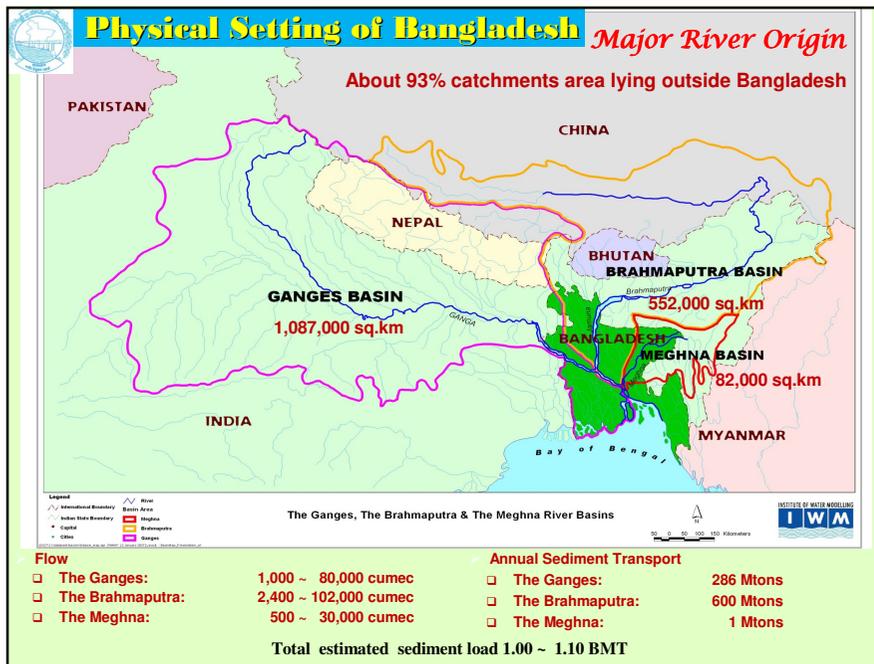
Bangladesh is highly vulnerable to Sea Level Rise

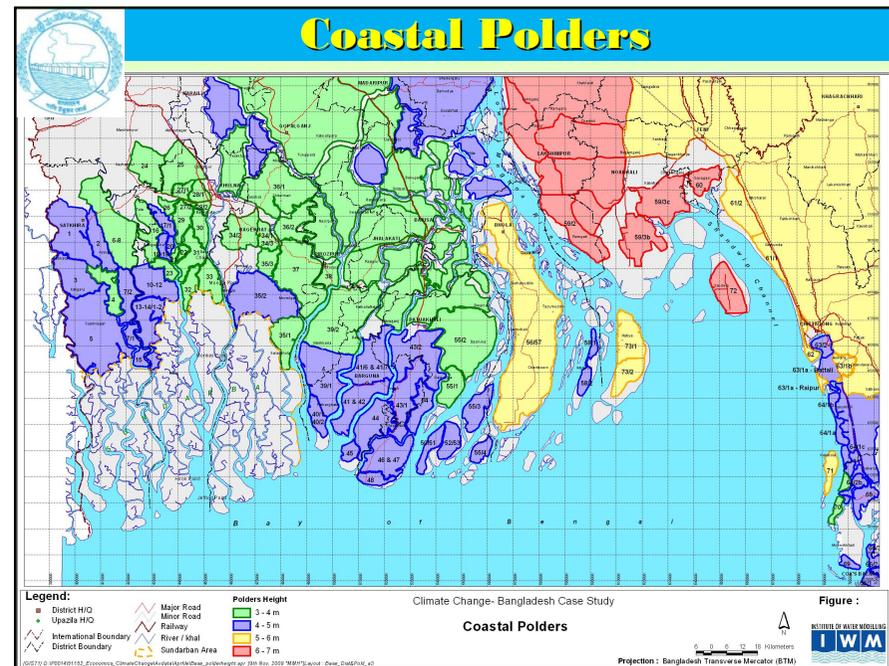
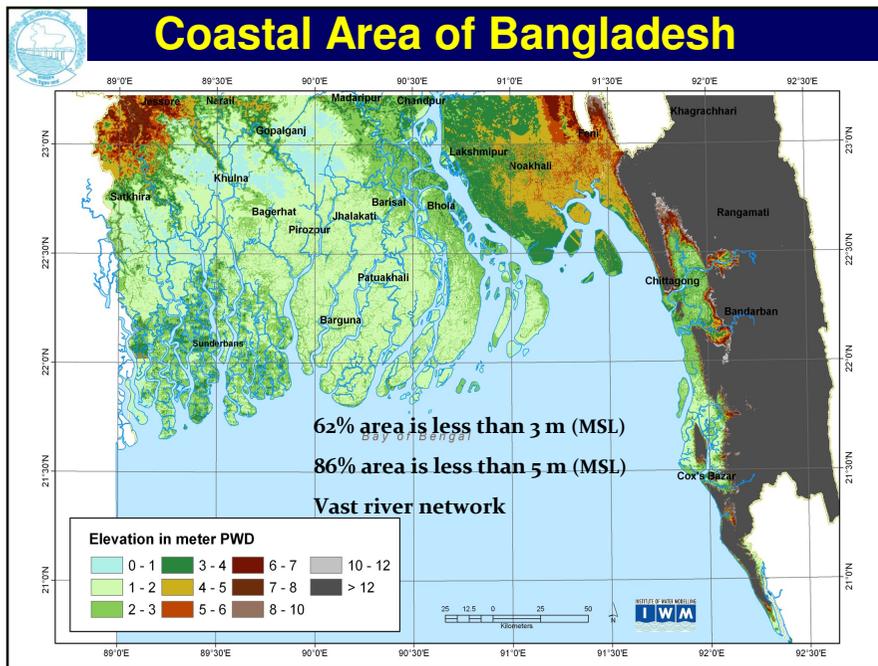
- geographical location on globe and very dense population living in the coastal area
- low adaptive capacity to climate change
- lack of awareness to climate change related hazards

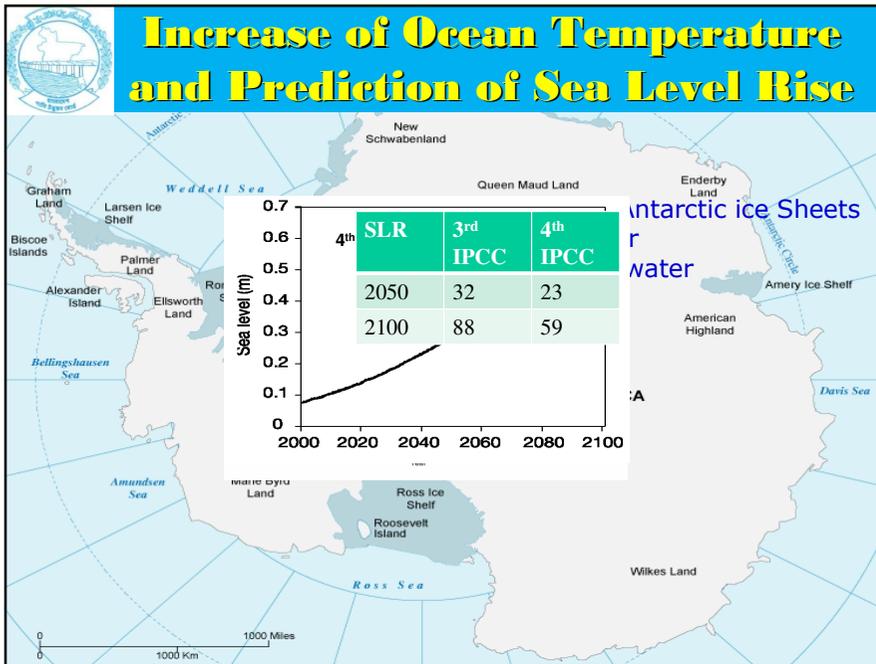
Physical Map of the World, August 1999

Geographic Locations of Bangladesh in Global Context









Climate Change and SLR Scenarios

Sea Level Rise (SLR)

- one of the detrimental impact of Global warming is Sea Level Rise

Projection Year	Mean Temperature change in °C			Mean Precipitation change in %			Sea Level Rise (cm)		
	Annual	DJF	JJA	Annual	DJF	JJA	IPCC	SMRC	NAPA
2030	1.0	1.1	0.8	5	-2	6	14	18	14
2050	1.4	1.6	1.1	6	-5	8	32	30	32
2100	2.4	2.7	1.9	10	-10	12	88	60	88

INSTITUTE OF WATER MODELLING
IWM



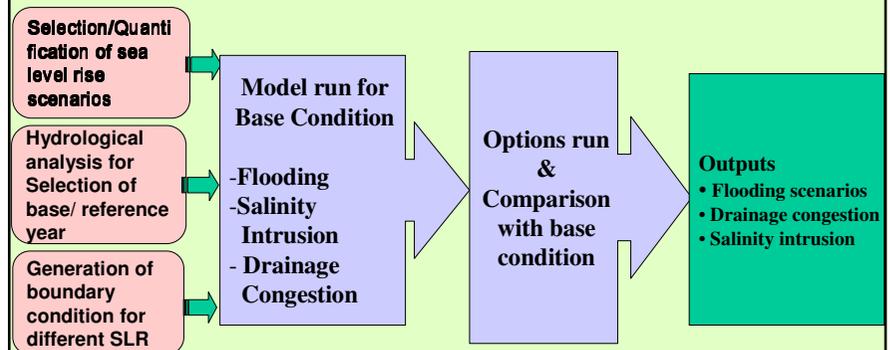
Objective of the Assessment

Assessment of primary impact of Sea Level Rise on

- Flooding (Inundation) Area
- Salinity Intrusion and
- Drainage Congestion in Coastal Polders of Bangladesh



Approach and Methodology



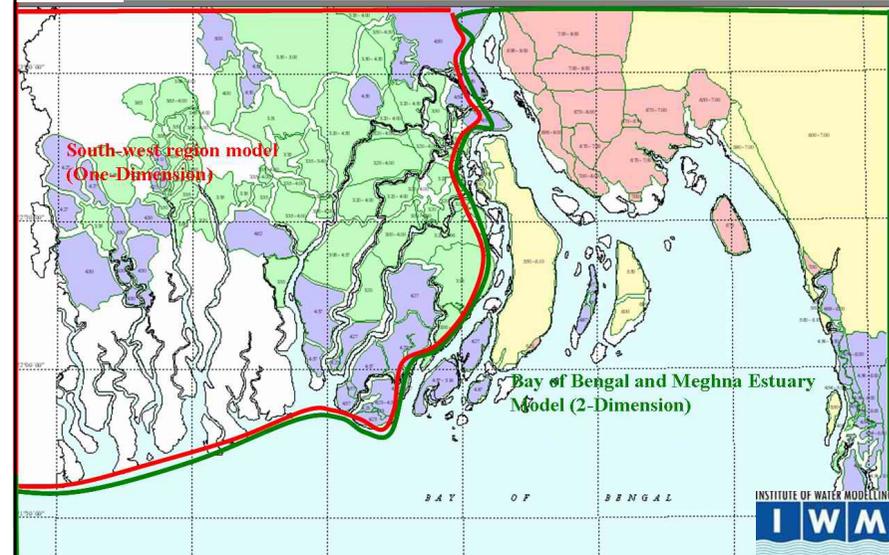


MATHEMATICAL TOOLS USED FOR THE STUDY

- MIKE 11: One-dimensional model of DHI Water & Environment
- MIKE 21: Two-dimensional model of DHI Water & Environment
- MIKE-GIS: Interface

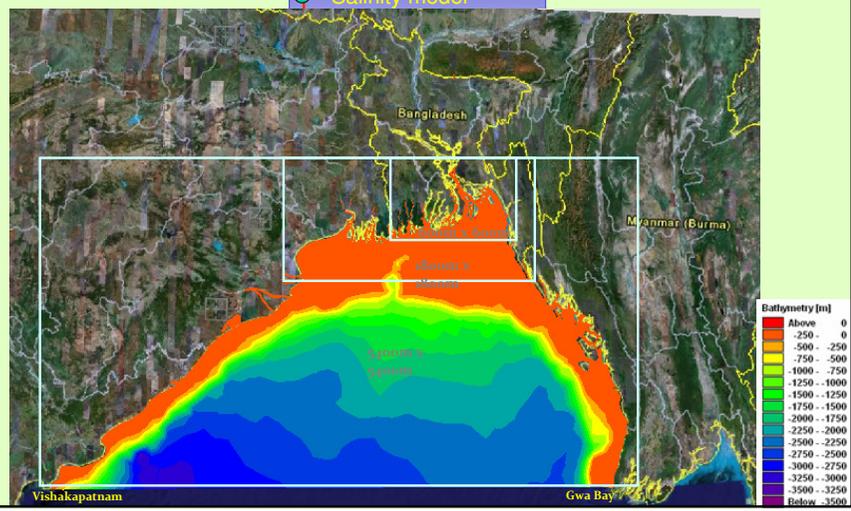


Rivers and Bay of Bengal Model

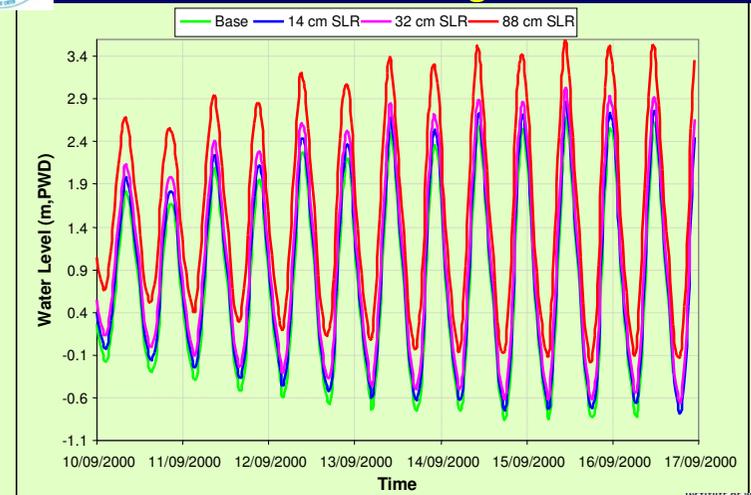


Bay of Bengal Model

- Hydrodynamic model
- Salinity model

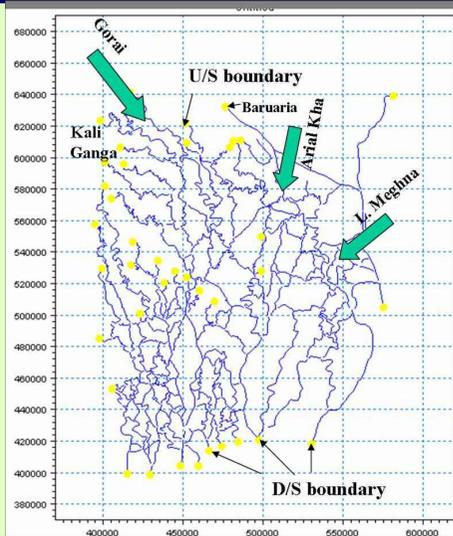


Generated D/S Boundary with different SLR using BOB Model





Schematized River system in the SW region showing U/S and D/S boundary

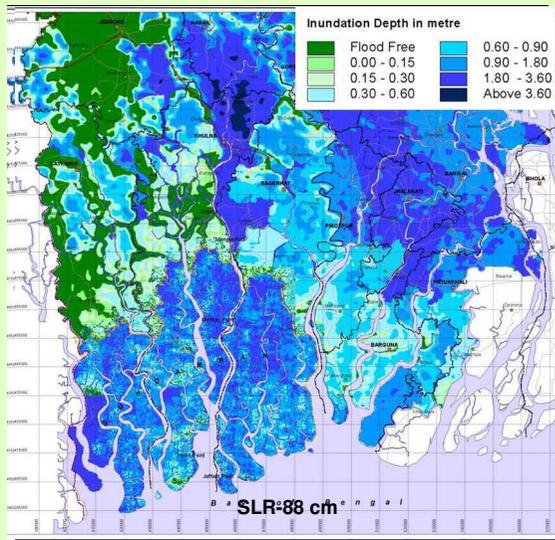


Assessment of Impact

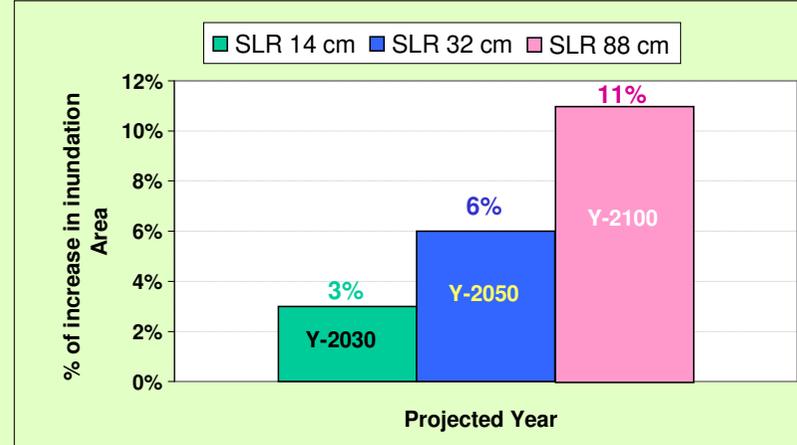
Impact of SLR on Flood Inundation



Flood Inundation Map



Increase in Inundation due to SLR in addition to base condition





Impact of SLR on Sundarban

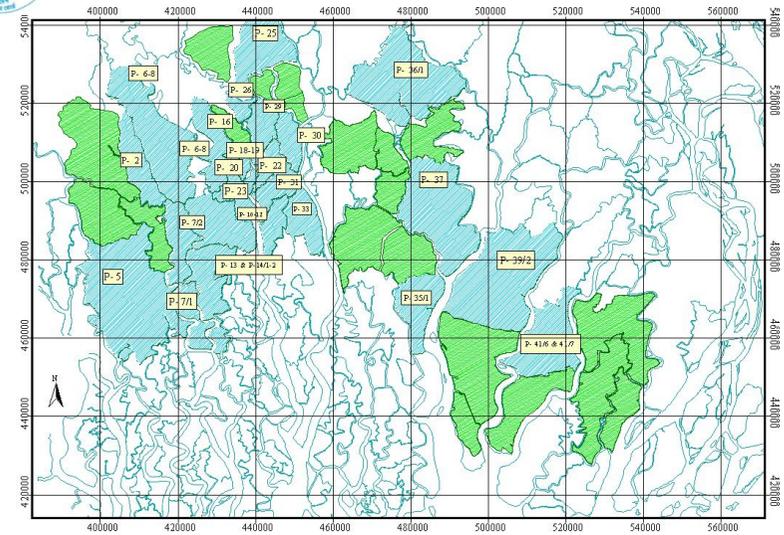
Impact of Inundation

SLR 32 cm : About 80 % of the Sundarbans will be deeply inundated

SLR 88 cm : The whole Sundarban will be inundated



Impact of SLR: Overtopping of Polder Embankment (88cm SLR)



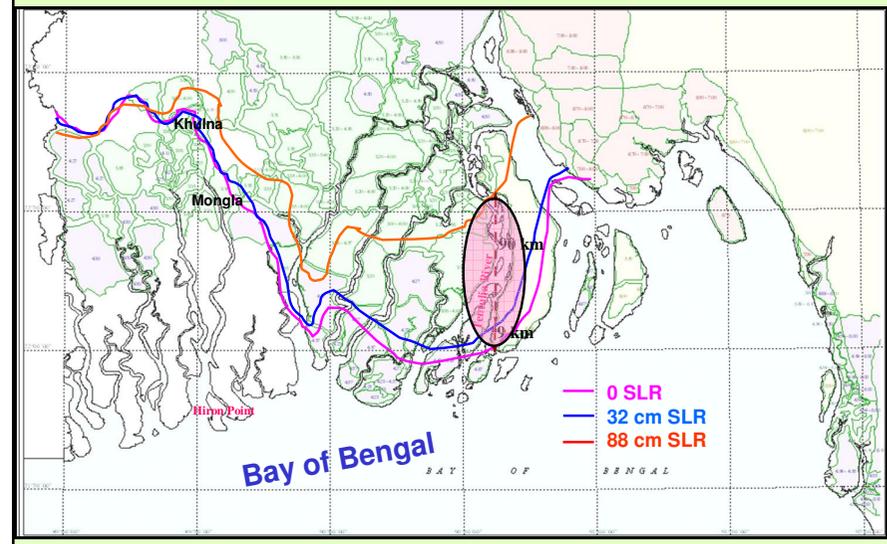


Assessment of Impact

Impact of SLR on Salinity Intrusion



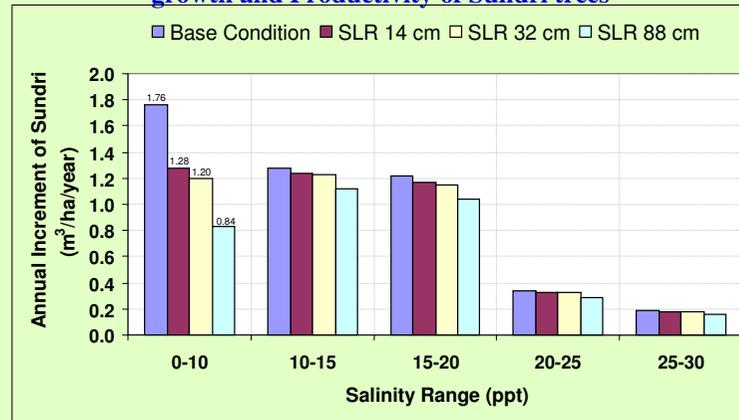
Intrusion of 5ppt Salinity line





Impact of Salinity Intrusion on Sunderbans

From the study it has been found that Salinity Influences the overall growth and Productivity of Sundri trees



Assessment of Impact

Impact of SLR on Drainage Congestion

Impact of SLR on Drainage Congestion

Impact of Sea Level Rise on Coastal polders

Polder No.	Total Area	SLR 0 cm	SLR 32 cm	SLR 88 cm
	(ha)	(ha)	(ha)	(ha)
P-36/2	13,322	2,600	5,300	Whole area

3-Days Duration Inundated Area (Depth > 0.3m) in October

Spring Tide

INSTITUTE OF WATER MODELLING
IWM



Limitations

- Increase in Precipitation due to Climate Change is not considered
- Land Subsidence is not considered
- Sedimentation on floodplain is not considered



Conclusions

- ▲ Sea level rise will affect Bangladesh coast through inundation, drainage congestion in the polders and increased salinity intrusion
- ▲ Action needs to be taken immediately for making awareness about SLR related hazards
- ▲ Assessment results may help the policy makers working in water resources management, fisheries, agriculture, forest, environment etc. for future project formulation



THANK YOU