Climate and Disaster Resilience at the City Level

Proposed Second Coastal Towns Environmental Infrastructure Improvement Project

– Scaling up of city-level interventions for building resilience of the urban poor in Bangladesh

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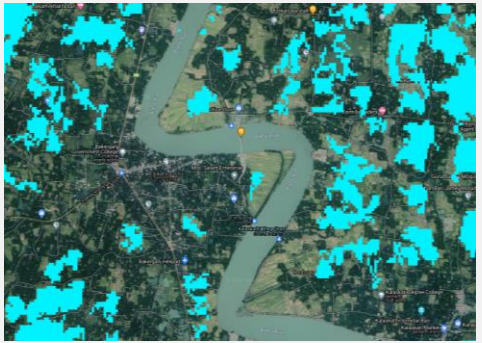
Climate Risk – context sharing

- Climate risk pose key challenges for Bangladesh in achieving high-income country status by 2041.
  - Cause an average loss of about 1.3% in the growth of GDP/per year
  - **Increases poverty incidence**
  - **Threatens agriculture, water resources, coastal development, human health, and labor productivity**

- Climate hazards interact with physical and socioeconomic vulnerabilities to increase risk

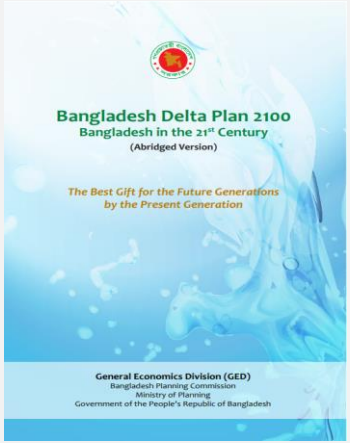
- Climate risk considerations cannot be seen as an ‘add on’ and need to steer urban development in a resilient and sustainable direction.

Tropical Cyclone Bulbul approaching West Bengal, India, and Bangladesh, November 2019. Image: NASA



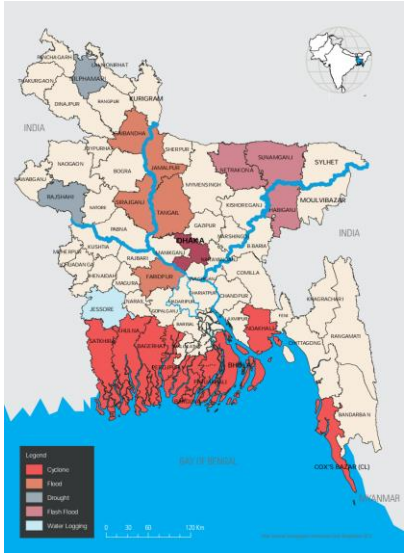
Flooding in Bakerganj from Cyclone Amphan 2020. Image. SPADE

Bangladesh Delta Plan 2100 Goal 1 "Ensure safety from floods and climate change related disasters“



Current Climate Vulnerability of Coastal Towns

Bangladesh: Disaster-prone Districts



Source: UNICEF: A GATHERING STORM: Climate change clouds the future of children in Bangladesh

I. Coastal pourashavas are already highly vulnerable to climate hazards

- Cyclones and storm surges are key hazards
- More intense rainfall, flooding, and riverbank erosion
- Sea level rise and salinity intrusion

III. Exposure to climate hazards are shaped by

- rapid unplanned development
- **low adaptive capacity**
- **high poverty levels (15-44%)**
- settlement in low-lying areas
- high dependence on fragile livelihoods

Table 1: Overview of Pourashava-wise climate Vulnerability

Sl no	Pourashava	District	Census Population (2011)	Annual compound growth rate	Proportion of population below poverty line (%)	Approximate Distance from Coast (km)	Coastal Flood	Cyclone	Extreme Heat	Wildfire	River flood	Urban flood	Water Scarcity	Landslide
1	Patuakhali	Patuakhali	65,000	-0.19	26.2	29	High	High	High	High	Low	Low	Medium	Very Low
2	Bagerhat	Bagerhat	49,073	0.34	23.8	83	High	High	High	High	High	Low	Medium	Very Low
3	Morrelganj	Bagerhat	21,741	-1.67	25.5	37	High	High	High	High	High	Low	Medium	Very Low
4	Mehendiganj	Barishal	30,067	-0.11	34.6	89	High	High	High	High	Medium	Medium	Medium	Very Low
5	Paikgachha	Khulna	16,017	-0.01	36.9	82	High	High	High	High	High	Medium	Medium	Very Low
6	Kalaroa	Satkhira	27,250	0.71	15.6	113	High	High	High	High	High	Medium	Medium	Very Low
7	Patharghata	Barguna	17,177	0.11	29.5	0	High	High	High	High	Very Low	Medium	Medium	Very Low
8	Gouranadi	Barishal	42,438	0.45	35.6	100	High	High	High	High	Medium	Medium	Medium	Very Low
9	Charfassion	Bhola	19,595	0.98	18.4	0	High	High	High	High	Low	Medium	Medium	Very Low
10	Burhanuddin	Bhola	13,110	-0.42	17.9	42	High	High	High	High	Low	Medium	Medium	Very Low
11	Betagi	Barguna	10,204	-0.18	31.1	36	High	High	High	High	Very Low	Medium	Medium	Very Low
12	Jhalokathi	Jhalokati	54,029	0.77	23.8	78	No data	High	High	High	Medium	Low	Medium	Very Low
13	Muladi	Barishal	20,490	-0.49	28.0	100	High	High	High	High	Medium	Medium	Medium	Very Low
14	Chalna	Khluna	14,188	-0.33	30.3	60	High	High	High	High	High	Medium	Medium	Very Low
15	Banaripara	Barishal	10,366	-0.31	21.7	90	High	High	High	High	Medium	Medium	Medium	Very Low
16	Bhedarganj	Shariatpur	8,169	0.62	25.5	108	High	High	High	High	High	Medium	Medium	Very Low
17	Swarupkati	Pirojpur	20,019	-0.6	25.1	67	No data	High	High	High	Low	Low	Medium	Very Low
18	Lalmohan	Bhola	20,522	0.26	19.9	21	High	High	High	High	Low	Medium	Medium	Very Low
19	Nalchity	Jhalokati	30,805	-1.02	43.9	62	No data	High	High	High	Medium	Low	Medium	Very Low
20	Zanjira	Shariatpur	21,251	0.78	20.3	137	High	High	High	High	High	Medium	Medium	Very Low
21	Kuakata	Patuakhali	9,177	1.62	37.8	0	High	High	High	High	Low	Low	Medium	Very Low
22	Bakerganj	Barishal	15,418	-1.18	24.4	61	High	High	High	High	Medium	Medium	Medium	Very Low

Source:
"Poverty Maps of Bangladesh 2016" by BBS and WFP
ThinkHazard - Bangladesh (1).pdf- Hazards are based on the District level risk.

Future Vulnerability of Coastal Towns due to Climate Change

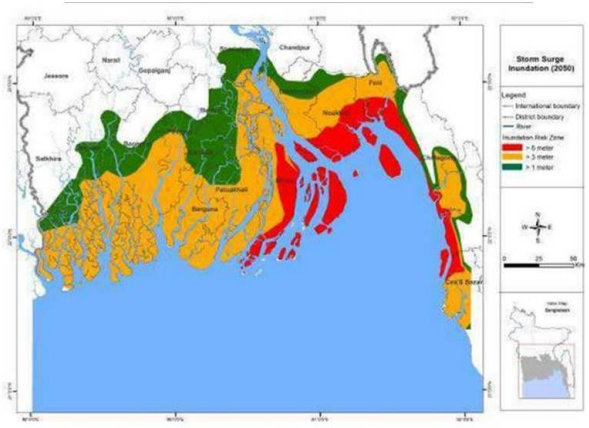


Figure 6. High-risk inundation area for cyclone-induced storm surge by 2050 in extreme climate change scenario (Source: IWM, 2014[29]).

Table: Vulnerable areas in Bangladesh due to storm surge induced inundation and projected depth of inundation for a baseline scenario without climate change and one with climate change.

Inundation depth (m)	Baseline scenario (km^2)	Climate change scenario (km^2)	Change (%)
>1	20,876	23,764	+14
3	10,163	17,193	+69

- Maximum temp projected to increase uniformly across the coastal towns.
- Projections indicate likelihood of increase in intensity for extreme rainfall events.
- Rising sea levels and cyclonic storm surges will increase the intensity and extent of coastal flooding, accelerate salinity intrusion, and hinder freshwater availability.
- All these factors contribute to negative health impacts and out-migration of the affected population due to loss of livelihoods.

Nature of losses

- **Physical** - neighbourhood or town level infrastructure impact on the living condition, continuing everyday life and mobility
- **Financial** - individuals and businesses lose working days and income
- **Human**: disruption of education and skills development causes drop-outs and long-term loss
- **Social** – casualties modify the household structure
- **Natural** – ecological – environmental degradations Capacity constraints at different

Challenges in Coastal Towns

- **Inadequate basic municipal infrastructure for resilience** – e.g. limited capacity of drainage to withstand increase in rainfall intensity, degradation of waterbodies, drains silted up and blocked with solid waste

- **Limited adaptive capacity of low income and vulnerable communities** – e.g., limited access to resilient livelihoods and to resilient infrastructures, early warning, and cyclone shelter

- **Capacity constraints at different government levels to strengthen resilience** – weak governance, low adaptive capacity, and inadequate coordination

Bhagerhat

Lessons Learned

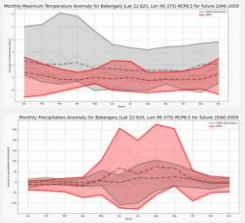
- Different groups of population such as vulnerable populations and women will experience differential vulnerability due to their higher sensitivity and limited adaptive capacity due to poverty
- Consider economic development in the context of changing climate risk and with an explicit focus on building resilience of the urban poor
- Diversifying livelihoods including specialized capacity building interventions for women improves the adaptive capacity of vulnerable communities.
- A holistic approach to adaptation is urgently needed, including infrastructure investments and enhancements to social, ecological (nature-based) and economic resilience and adaptive capacity.
- Climate and disaster risk assessments and preparation of disaster management plans should be for *pourashavas*/citizen instead limiting to assets and infrastructure and should inform future urban development trajectory.

Assessment to Inform SCTEIIP Concept Design (ongoing)

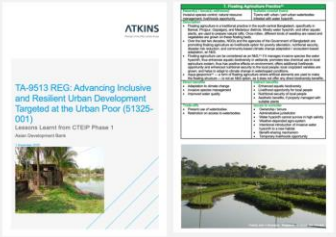
1. Understanding current risk

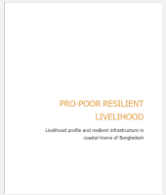
3. Review of DED from climate risk angle

2.Downscaling of future climate risk scenario (CMIP 6)



4.Review of CTEIP design from climate risk angle and identifying opportunities for NBS

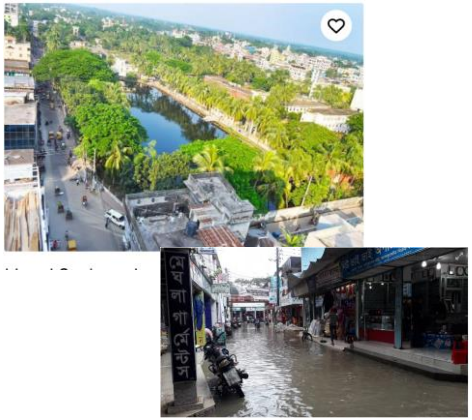




5. Study on Pro-poor resilient livelihood

Ongoing support provided through UCCRTF supported RETA 9513: Advancing Inclusive and Resilient Urban Development Targeted at the Urban Poor and SPADE

Proposed Solutions for 22 coastal towns



Sadar Road in Patuakhali town remained under knee-deep water for the last couple of days, Aug 2019

Impact: higher and sustainable growth trajectories achieved in the face of the various weather-related natural hazards and risk and improved livability of coastal towns

Strengthening the resilience of towns, human and natural systems to the impact of climate change

Outcome: climate and disaster resilience of coastal towns strengthened including benefiting the poor and women

Output 1: Municipal infrastructure for resilience improved. Infrastructure in urban areas needs to better respond to vulnerable population and women-specific needs arising from new social, economic, and environmental changes; storm water drainage to reduce losses from floods; safe mobility and access to municipal services;

Output 2: Livelihood resilience improved. Reducing informality and encouraging vulnerable populations including women entrepreneurship- skills **t**raining, matching with industry demands and establish linkages; promoting networks and social capital; inventory of productive asset of each household maintained and insured; Graduation Approach and Program lunched.

Output 3: Institutional capacity, governance, and climate-awareness strengthened Performance-based budget allocation, stakeholders equipped with adequate data, information, and skills that will help them to respond to the impacts of climate change

Thank you