



GLOBAL  
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ADAPTATION

**Deltares**

**Webinars for Futureproofing with Adaptation Strategies and Financing**  
**Water and Climate Adaptation Strategies – the Case of Bangladesh**

20 October 2023, 11:00 CEST

**Webinar Knowledge Kit**

An aerial photograph of a long, multi-span concrete bridge crossing a wide river. The surrounding landscape is a mix of green wetlands and agricultural fields, with some small buildings visible. The sky is blue with scattered white clouds.

# Knowledge Kit Content

- Background
- Presentation: **Climate and Land Use Changes - Implications for Water and Food Security in Bangladesh** Catharien Terwisscha van Scheltinga and colleagues Wageningen University and Research
- Presentation: **Locally Led Adaptation: Ensuring Water, Sanitation and Hygiene in the coastal belt of Bangladesh** Hasin Jahan, Country Director, WaterAid Bangladesh
- Presentation: **Stress-Testing Infrastructure in Bangladesh**, Tanim Istiaque Senior Program Officer, Infrastructure and Nature-Based Solutions Program, GCA
- Related Links
- Stay Connected



# Background

## Chair:

H.E. Md. Abul Kalam Azad, Climate Vulnerability Forum  
Bangladesh, Special Envoy

## Speakers & Topics:

- H.E. Mr. Riaz Hamidullah, Ambassador of Bangladesh to the Netherlands, Opening Remarks
- Dr. Nurun Nahar, Planning Commission of Bangladesh, Bangladesh 2100 Plan
- Ms. Catharien Terwisscha van Scheltinga, Wageningen University & Research, Climate and Land Use Changes - Implications for Water and Food Security
- Ms. Hasin Jahan, WaterAid, Bangladesh Country Director, Locally Led Water Adaptation
- Mr. Tanim Istiaque, Senior Program Officer Infra & NbS, GCA, Stress testing Infrastructure

Watch the recording [here](#).

- As the impacts of climate change continue to intensify, coastal flooding risk will increase, affecting the lives of hundreds of millions of people and putting infrastructure valued between US\$7.9 - 12.7 trillion. Globally, 40% of the population live within 100 km of the coast, and 11% live in low-lying coastal areas, where the impacts of sea level rise could be felt as soon as 2050. Accelerating adaptation efforts is essential to protect people, landscapes, economies, and even the very existence of some islands and deltaic coasts.
- ‘Futureproofing: Water and Climate Adaptation’ was a webinar series focused on adaptation strategy, practices, and financing for coastal areas, including islands and deltas. ‘Water and Climate Adaptation Strategies – the Case of Bangladesh’, features cases of linking water and climate adaptation for project implementation in Bangladesh. The series was designed to support the ambition of the International Panel on Deltas and Coastal Areas - to build capacity for effective adaptation planning, governance, and finance.
- Learn more and join the Water Adaptation Community: <https://communities.adaptationportal.gca.org/>
- Learn more about the International Panel on Deltas and Coastal Areas: <https://deltasandcoasts.net/>

# Climate and Land Use Changes - Implications for Water and Food Security in Bangladesh

Catharien Terwisscha van Scheltinga and colleagues  
Wageningen University and Research  
Catharien.Terwisscha@wur.nl



# Overview

1. Introduction
2. Climate and land use change in Bangladesh
3. Implications for water and food security
4. Reflection on possible next steps



Short CV

Catharien Terwisscha van Scheltinga

- Senior Researcher, Water & Food Systems, Wageningen Environmental Research
- Originally trained in irrigation and soil and water conservation
- Working on integrated water management
- Leading WUR research on deltas
- 30 years of experience in Bangladesh
- Contributed to BDP2100
- Catharien.Terwisscha@wur.nl
- <https://weblog.wur.eu/fnh-ri/combined-insights-stimulate-sustainable-food-production-in-deltas-under-pressure/>
- [www.wur.eu/food-in-deltas](http://www.wur.eu/food-in-deltas)

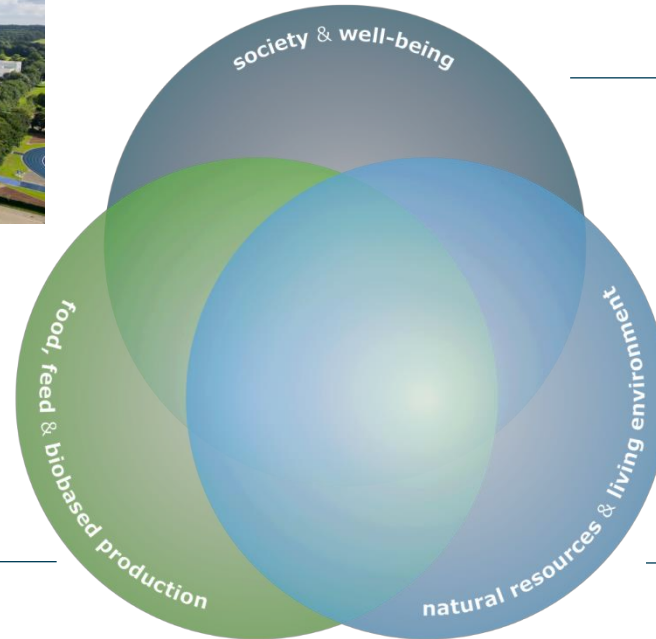
# Wageningen domain: Food and Living Environment

Mission:  
to explore the  
potential of nature  
to improve the  
quality of life

[www.wur.nl](http://www.wur.nl)



- Sustainable production and food processing
- Animal feed and biobased products
- International food chains and networks
- Food security and food health aspects



- Food and Living environment
- Lifestyle
- Perceptions
- Governance
- Market and chains
- Social innovations

- Nature and landscape
- Land use
- Water, sea and natural resource management
- Biodiversity



**100years**

# WUR engagement in Bangladesh

1. Trade off and Synergies
2. Transition pathways
3. Salinity Hotspot Identification
4. Water for food for future (JCP – MIR)
5. Seasonal to sub-seasonal forecasting (S2S)
6. Climate Smart Agriculture

## Collaboration with

- knowledge institutes (IWM, CEGIS, BUET, BAU, KU, PSTU), government organizations (DAE, BMD)
- NGOs (Solidaridad, Uttaran, Max Foundation) and private sector (Lal Teer)
- and international organizations (FAO, WB, ADB, IRRI, CIMMYT)





# Different types of change, simultaneously

## Climate Change

- IPCC expects the total annual amount of rain to go up
  - At ICWFM9: Increase in extreme events of higher intensity
- = More, at uncertain times – uncertain patterns



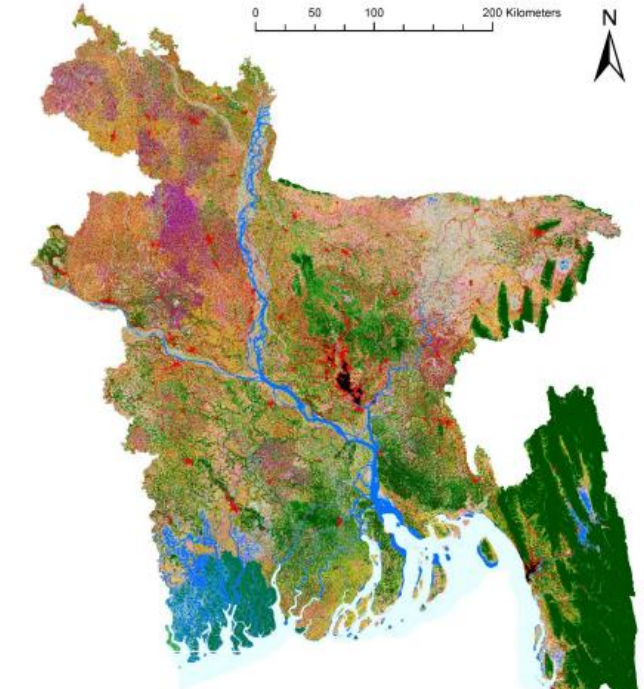
## Land use change

- Cities increasing
- Forest, nature, wetlands decreasing
- Agricultural land decreasing

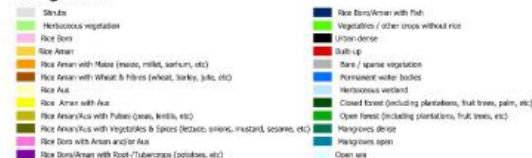
NB: Diet also changing

# Complex: data / facts

- Land use classification Bangladesh, combining and downscaling existing databases (figure 10)(Van Haren et al, 2022)
- [DOI: 10.18174/576671](https://doi.org/10.18174/576671)



Land use classification  
Land use 2020  
Bangladesh



# Salinity

Complexity – regarding facts on salinity:

- Water (ground water and surface water) and soil related salinity (not same)
- Salinity is seasonal (not same throughout the year)
- and not same over the years (increasing)
- Different depths
- Affected by rainfall – variability and change
- Affected by water management and land use
- Affected by sea level rise

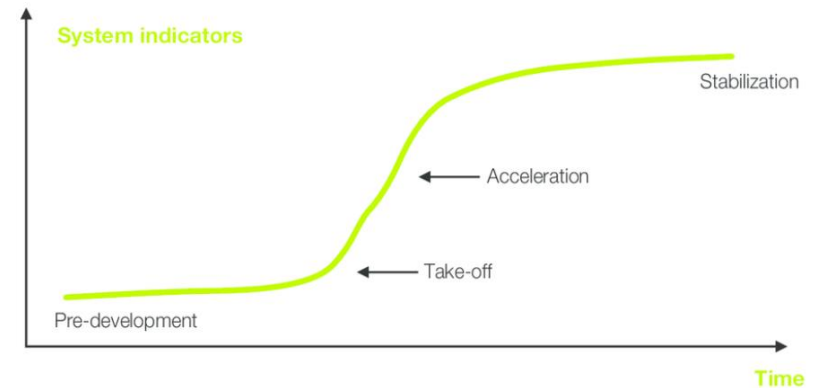
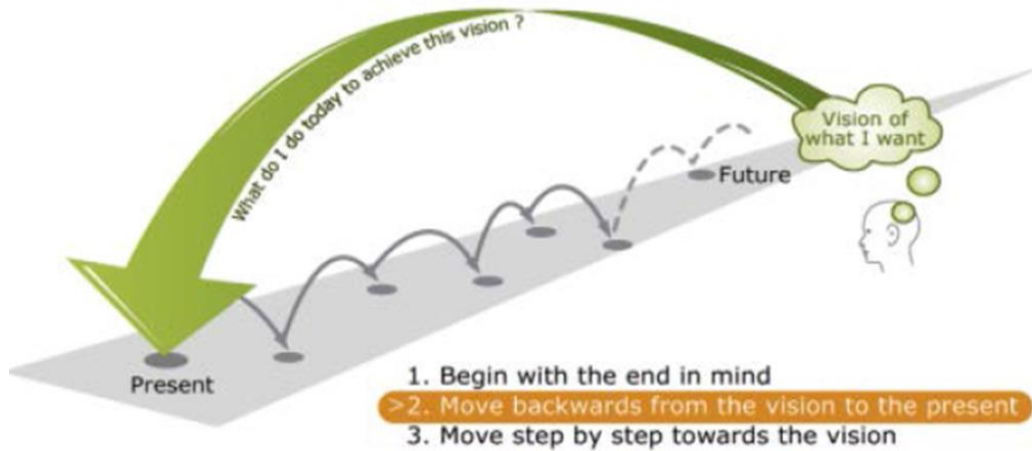
WUR currently working on global hotspot identification  
– also interested to work at national level.



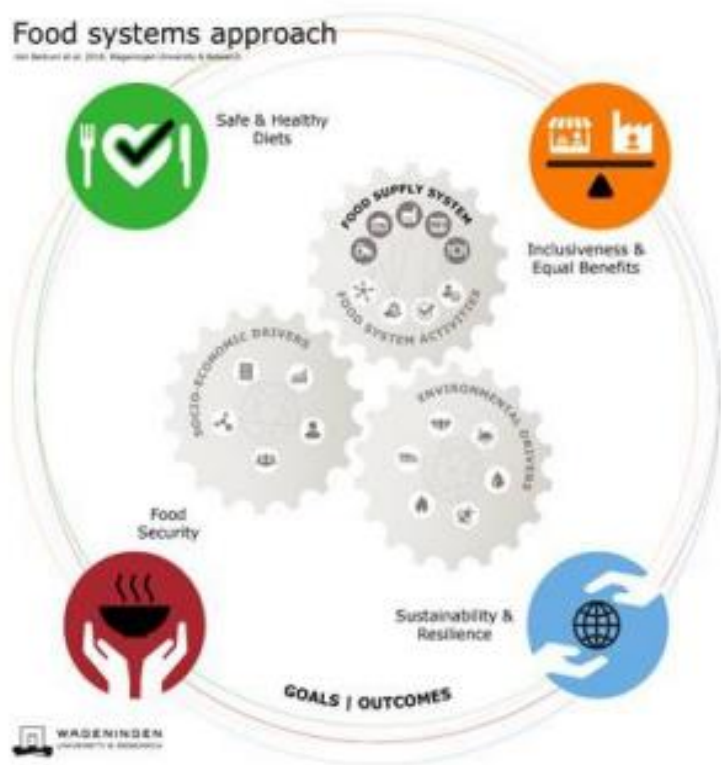
## 2. Longer term: uncertainty and complexity



# Transition to future - Pathway



# Food System Approach: Changing agriculture and food situation in deltas



- Value chain
- Environmental factors
- Socio-economic factors

1. Focus on production alone is not enough
2. Need for a systems approach: Bringing balanced approach in the picture
3. Need to deal with uncertainty and complexity



# Bangladesh agriculture system change

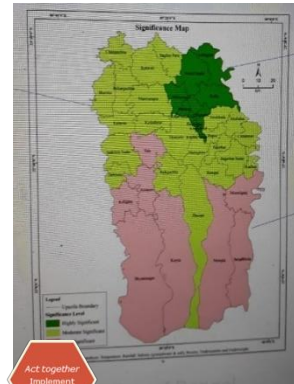


- WUR research collaboration with Solidaridad: exploring pathways

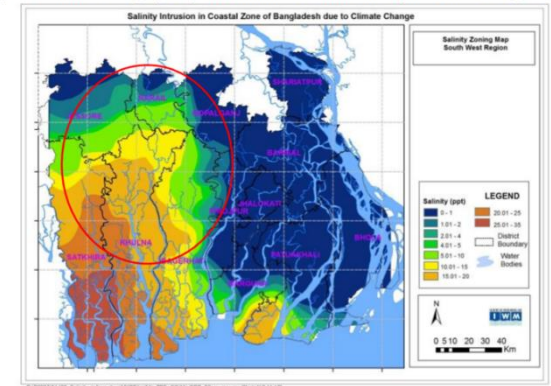
- Dairy/salinity
- Mango export
- Shrimp/mangrove
- Vegetables



<http://www.plancomm.gov.bd/>



May, 2030 climate change (A1B) with minimum Transboundary flow under Ganges Treaty



# Cattle - future





- More demand for milk
- Need safe drinking water
- Water more saline in future
- Start fodder cultivation
- Road development
- Personal circumstances





# Transition Pathway: farmers perceptions at field scale



Experience in south west Bangladesh	Current		Future		Transition Pathway towards perceived sustainable future
<b>General information</b> <ul style="list-style-type: none"> <li>• Salinity level</li> <li>• When highest</li> <li>• where highest</li> </ul>					
<b>Agriculture</b> 					
<b>Livestock</b> 					
<b>Shrimp</b> 					
<b>Drinking Water</b> 					

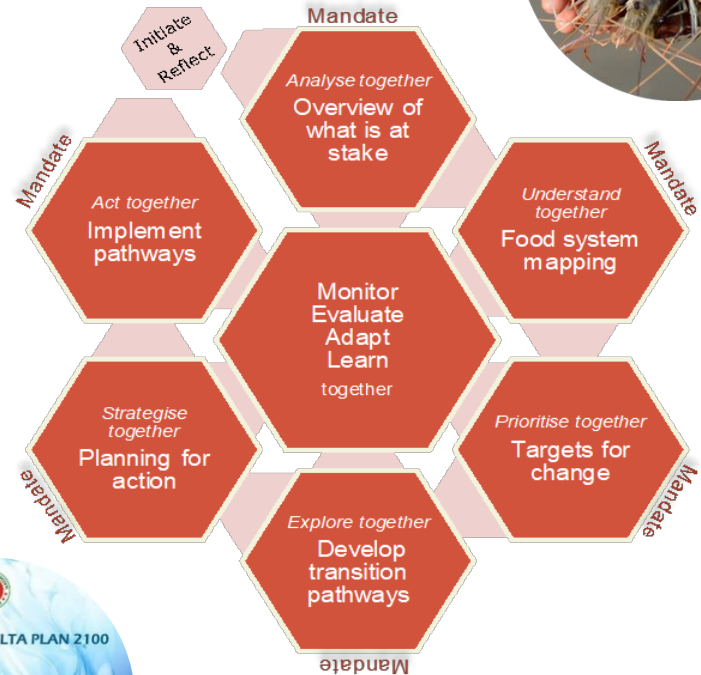
# Bangladesh agriculture system change



WUR research on water management and food systems in deltas: [www.wur.eu/food-in-deltas](http://www.wur.eu/food-in-deltas)

<https://research.wur.nl/en/publications/food-systems-in-the-bangladesh-delta-overview-of-food-systems-in->

Interesting question: can we use these (water and) food system guidelines to link e.g. BDP and AT programmes to create synergy?



# Next steps

- BDP2100 – regular update
- Further alignment, e.g. water and food: explore synergies between BDP2100 and Agric Transformation Program
- Strengthen the link international-national-local, e.g. on salinity
- Information services for farmers
- Youth – capacity building – e-learning on BDP2100 and water and food alignment





# Thank you ধন্যবাদ

## Summary


1. Water and food decisions interrelated – systems approach
2. Climate and land use change are happening simultaneously
3. Study, data and monitoring parallel with implementation



## Next steps

1. Address salinity
2. Info services for farmers
3. Youth – E-learning

Catharien.Terwisscha@wur.nl



Spark the future, **join the Challenge!**

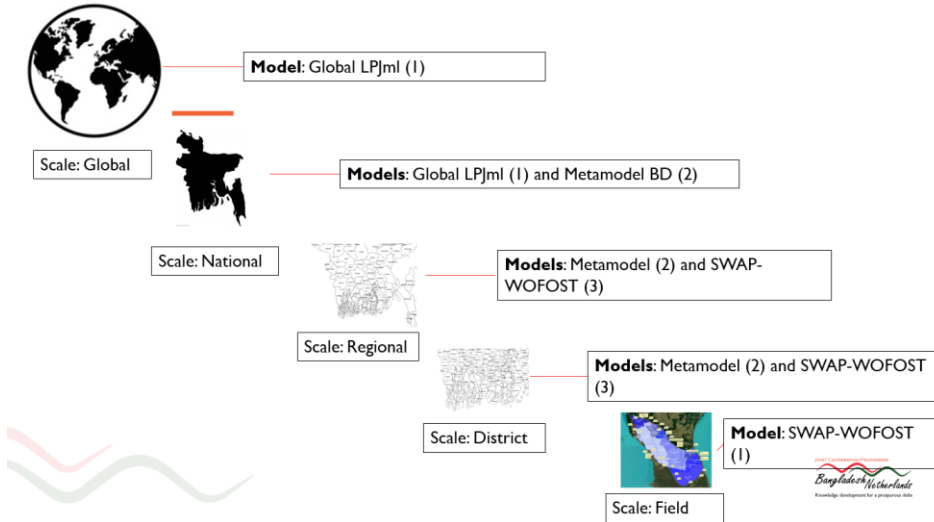
Nature-based  
**Future**  
Challenges

<https://www.nbfchallenge.nl/>

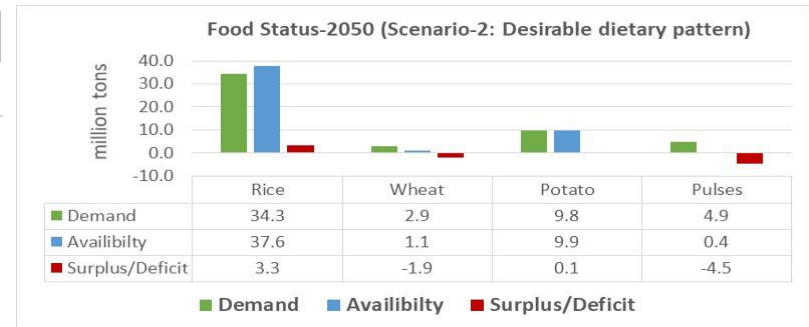
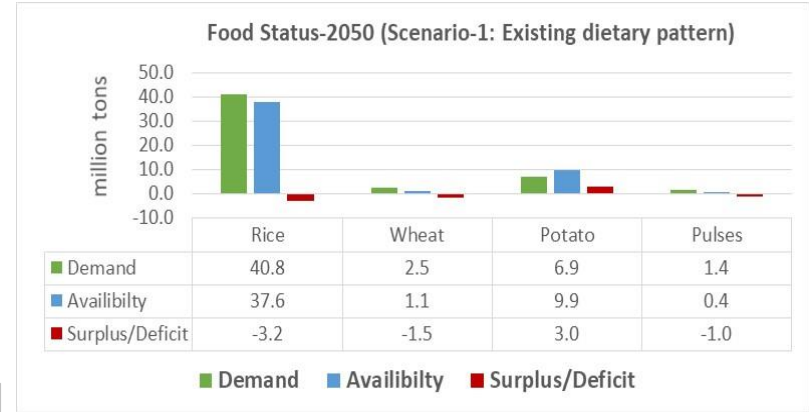


SPARK THE FUTURE,  
JOIN THE CHALLENGE!

# 4. Water – agriculture – food - future



JCP – Make it Real – [www.jcpbd.nl](http://www.jcpbd.nl)  
[Judit.Snethlage@wur.nl](mailto:Judit.Snethlage@wur.nl)





# Locally Led Adaptation:

## Ensuring Water, Sanitation and Hygiene in the coastal belt of Bangladesh

Presented by

Hasin Jahan, Country Director,  
WaterAid Bangladesh



WaterAid



## At WaterAid we are..

1. **Context: Understanding the WASH and Climate Lens**
2. **Our Participatory Ward Vulnerability Assessment Approach: *Recognizing the value of local knowledge and expertise to address climate risk***
3. **Case Study of the Water Entrepreneurship for Women's Empowerment (WE-WE) : *Working on ensuring local actors on the frontline of climate change have equitable access to power and resources to build resilience***



# Understanding Context

# Climate Change & WASH in Bangladesh

## Climate change induced shocks and stresses

## Climate change impacts on WASH

Climate Change and Variability

Sea level rise

Increase in Temperature

Erratic Rainfall/drought

Increased Intrusion of saline water

Cyclone and storm surges

Tidal surge and Coastal flooding

Water quality

Water quantity

Water access

WASH Infrastructure

Health and well-being

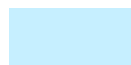
Exacerbated by climate change: 3.79 million people don't have access to clean water.  
75.4 million people don't have a decent toilet.

*These figures not only important to change to achieve SDG targets however these figures shows how inaction to climate change can change this figures drastically*

**For every \$1 spent on making WASH infrastructure resilient to flooding could avoid at least \$62 in flood restoration costs**



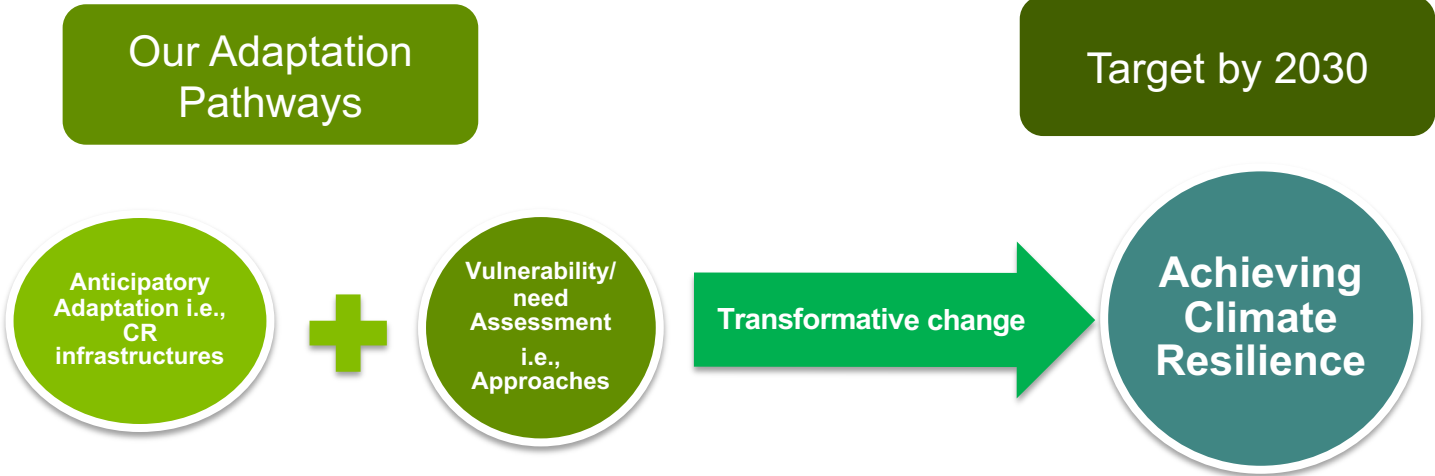
Slow onset shocks



Sudden stresses



# Context: Our approaches to CR WASH



**Recognizing the value  
of local knowledge and  
expertise: Participatory  
Ward Vulnerability  
Assessment**

# Participatory Ward Vulnerability Assessment

## LLA Principles: How do we orient people from the lowest tier? (Devolving Decision Making, Investing In Local Capacities )

- Debates about how development or climate interventions focuses on what “Donors or INGOs” want
- We are changing this narrative. PRA tools are not new neither approaches are different from existing ones
- However, our approaches include certain aspects that makes different
- Access study here: <https://sanitationlearninghub.org/resource/a-participatory-assessment-for-climate-induced-wash-vulnerabilities-in-bangladesh/>



### What we did: Participatory Ward Vulnerability Assessment

This participatory assessment of WASH vulnerabilities included a climate lens.

The Participatory Ward Vulnerability Assessment (PWVA) is an assessment tool for analysing local-level vulnerability in climate-stressed areas originally developed by WaterAid Bangladesh in 2013. The tool collects information at 'ward' level (which is below the lowest tier of administration in Bangladesh) to understand the vulnerability of WASH infrastructure, WASH behaviour and practices in a given area to advocate for change at both local and national level.



if they were unavailable, their partners or other senior members responded. Simultaneously, qualitative tools were deployed for the data collection of this study.



Data validation at Ward-level (Rupantar/Sadia)

The qualitative aspect involved a two-day consultation in each ward. The first day was dedicated towards the identification of persisting WASH problems in the wards along with the preparation of a social map and an institutional map. The second day of consultation started with consolidation of a seasonal calendar of the problems identified on the first day. It ended with the preparation of a comprehensive planning document which suggested potential solutions to seasonal climate induced impacts on WASH practices





# Participatory Ward Vulnerability Assessment

**P**

**Bottom-up approach**  
**Community based**  
**Engagement with local government**  
**Involvement of stakeholders**

**W**

**WDMC**

- Leads the PWVA
- Comprises 20-25 members irrespective of age, gender and religion
- Vital role in raising awareness, building capacity and motivating the community

**V**

**WASH**

**Agriculture**

**Fisheries**

**Health**

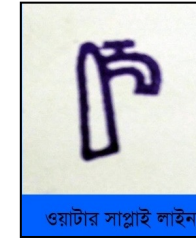
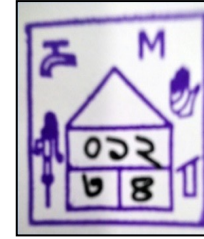
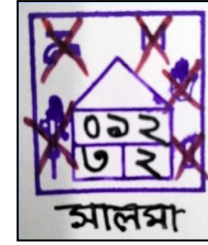
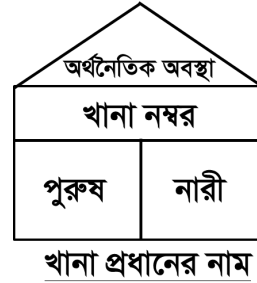
**Education**

**Transportation**

**A**

**(Participatory Rural Appraisal) PRA Tools**

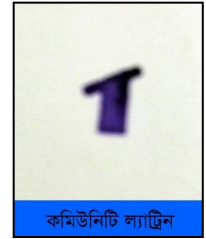
**HH survey**



ওয়াটার সাপ্লাই লাইন



কমিউনিটি নলকূপ



কমিউনিটি ল্যাট্রিন



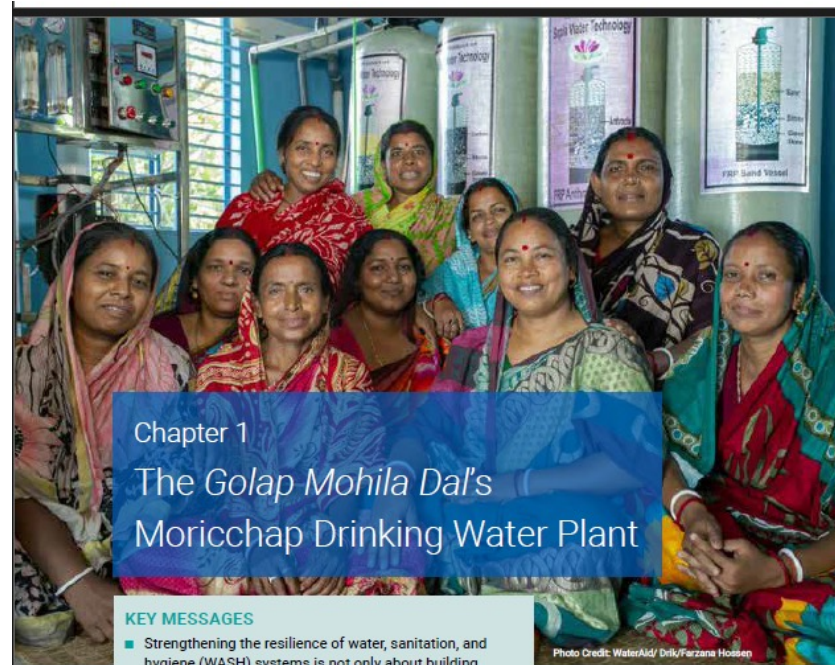
## Quick Look

The community together produces a geographic map of the area including socioeconomic status and WASH situation of households

# **A Case Study of LLA: Water Entrepreneurship for Women's Empowerment (WE- WE)**



# Understanding the WE-WE Approach



#### KEY MESSAGES

- Strengthening the resilience of water, sanitation, and hygiene (WASH) systems is not only about building infrastructure to withstand cyclones or tidal surges, but also about leadership and ownership by local communities; strong and inclusive government leadership; well-functioning and accountable institutions; and strategies to tackle gender and social inequalities.
- Building trust, a key ingredient for successful adaptation, is a long-term process. This can be facilitated by working with local organizations who already have good relationships with the community. Long-term local institutional capacity building can also be strengthened in this way.
- WASH provision can reduce internal migration, and promote leadership and entrepreneurship by vulnerable groups. This leadership and entrepreneurship, meanwhile, can change perceptions on traditional roles in society, and inspire others.

Devolved decision making

Addressing structural inequalities

Patient, predictable, accessible funding

Investing in local capacities

Building understanding

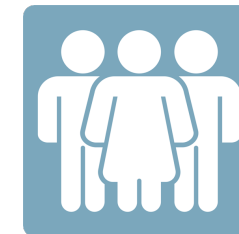
Monitoring, evaluation, and learning

Transparency and accountability

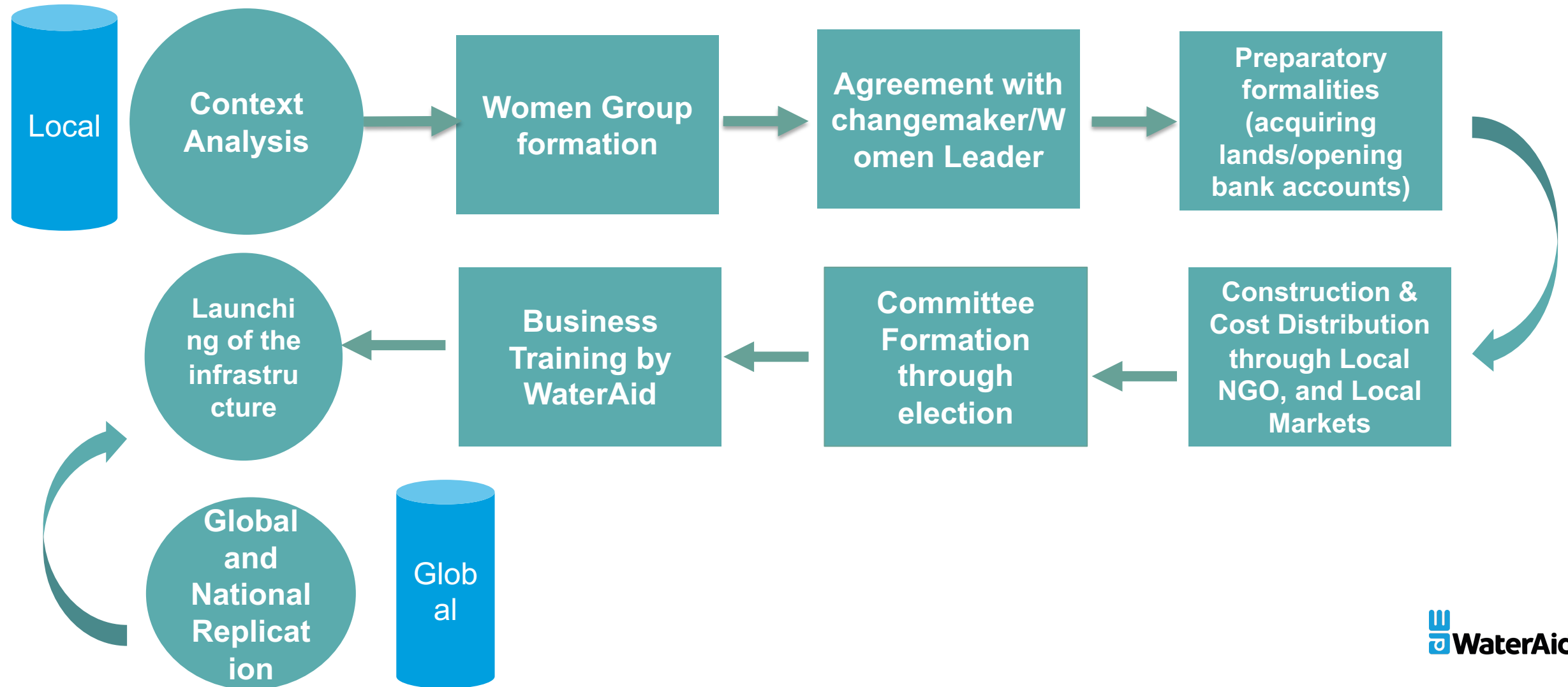
Collaborative action

**LLA Principles: Social Justice and Gender Equality (Devolved Decision Making, Addressing Structural Inequalities, Investing in Local Capacities)**

Access Stories of Resilience Chapter 1:  
<https://gca.org/reports/stories-of-resilience-lessons-from-local-adaptation-practice/>



# WE-WE Approach – Water Entrepreneurship for Women’s Empowerment (WE-WE)





# Successes and Challenges



## Successes

- women becomes independent
- they venture into other businesses after repaying loans through profits

## Challenges:

- Long term sustainability
  - Discrimination
- Technological Cost
  - Finance

WaterAid/Rupantor

**How do we approach  
full localization?**

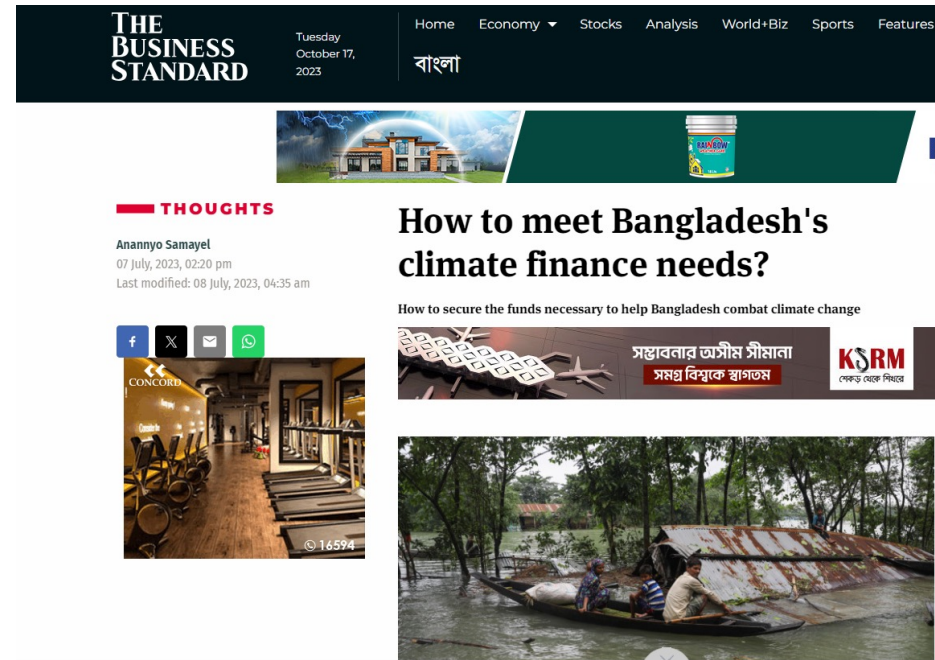
# Climate finance not adequate and not reaching the frontlines



*Climate Finance Shadow Report 2023: Assessing the delivery of the \$100 billion commitment*



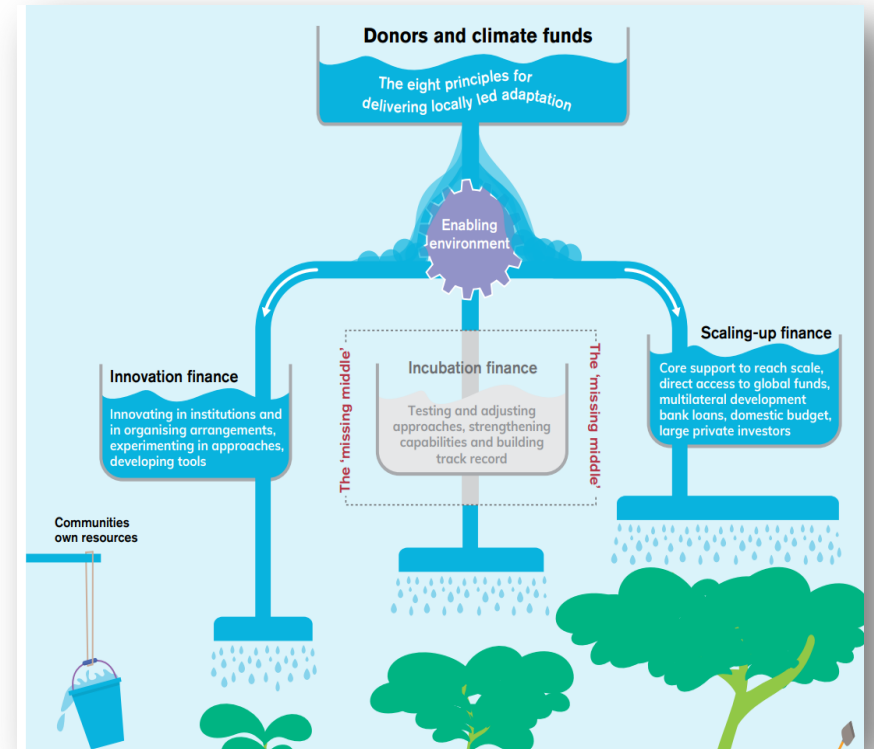
*We are still figuring out top-down approaches*



# How do we finance the missing middle



- Globally less than 3% of Global Climate Finance are allotted for the water sector (WaterAid, SIWI 2021)
- It is seen that for locally led adaptations like the WE-WE to succeed we need long term incubation finance to see adaptability of such initiatives
- *The ‘missing middle’ in climate finance to incubate local institutions* ( Principles of Locally Led Adaptation; A call to Action, January 2021) is not just a necessity it is essential



Principles for locally led adaptation: Marek Soanes et al.,



## Way forward: Towards LLA and *Business Unusual*



- **Promote “one ward one committee one plan” approach that can avoid duplication with donors, national governments and local actors**
- **Integration of various actors with different development focus under one umbrella**
- **Promoting horizontal and vertical integration is a key sustainability objective of this program.**
- **Climate information tools are co-produced and tailored to local people’s context and needs can solve the missing middle**

Thank you



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# Stress-Testing Infrastructure in Bangladesh

Tanim Istiaque

Senior Program Officer

Infrastructure and Nature-Based Solutions Program, GCA



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# National Infrastructure Stress-test: Goals

- Quantify infrastructure networks' vulnerabilities to climate hazards
- Prioritize investments on the most effective Adaptation and Resilience measures
- Support national stakeholders in integrating climate resilience into policy and planning



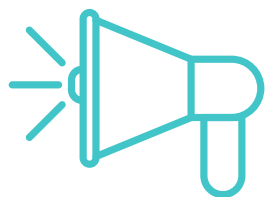


# The Global Center on Adaptation

- The Global Center on Adaptation advances bold actions that help societies across the world become more resilient to climate-related threats.
- Aim to **scale-up and accelerate climate adaptation** worldwide
- Offices in Netherlands, Africa, South Asia and Asia Pacific.



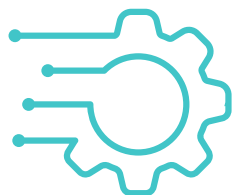
# GCA: Three strategic approaches for Adaptation



Advocacy and Agenda  
Setting



Knowledge



Programs

## Program Infrastructure and nature-based solutions :

- **National Infrastructure Stress-Tests** and Adaptation Pathways
- **Climate Resilient Infrastructure Assets** & Green Adaptation Solutions
- **Masterclass for Climate Resilient Infrastructure** and Public-Private Partnerships



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# Climate-Resilient Infrastructure and Stress Test in Bangladesh

# Project partners and Approach



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UNOPS



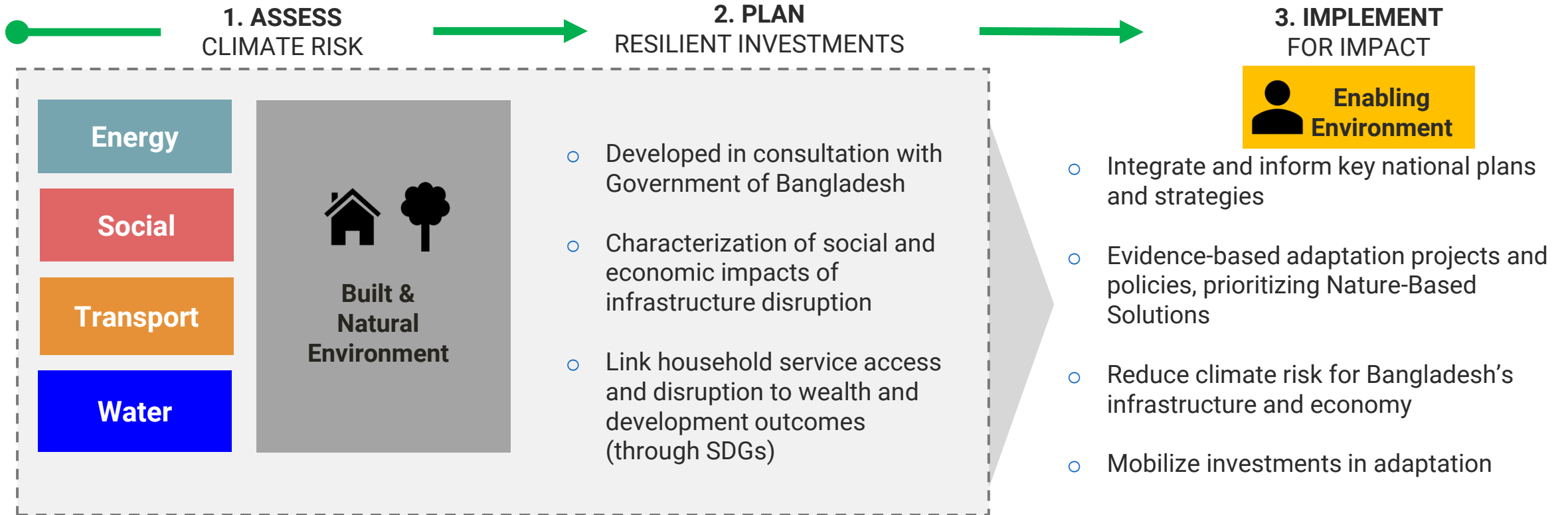
CEGIS  
Center for Environmental and Geographic Information Services



THE WORLD BANK  
IBRD • IDA | WORLD BANK GROUP



Ministry of Infrastructure  
and Water Management  
of the Netherlands

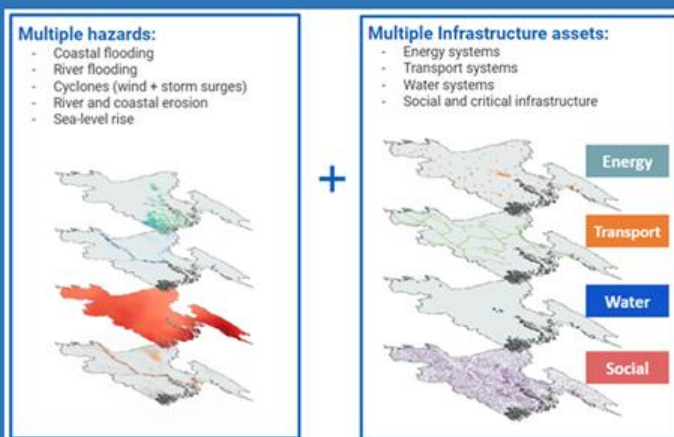




## STRESS TESTING BANGLADESH'S INFRASTRUCTURE TO CLIMATE RISKS

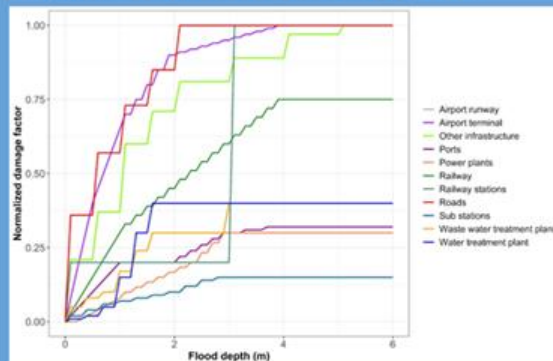
### Part 1: Assessing climate hazard impacts on infrastructure assets and networks

Intersecting spatial hazard and infrastructure data to identify critical assets and pinpoint hotspots of risk for baseline present day and a range of future climate scenarios.



### Part 2: Calculating economic damage to infrastructure systems

Use well-established depth-damage functions to assess the direct damage of climate hazards on critical infrastructure systems, now and for a range of future climate scenarios.



## INFRASTRUCTURE SERVICE PROVISION TO HOUSEHOLDS IN COASTAL BANGLADESH

### Part 1: Assessing climate hazard impacts on infrastructure assets and networks

Use household-level data to assess how infrastructure service disruptions affect household welfare through inaccessibility to basic services. Analyse how service disruptions affect households differently across wealth groups and demographic characteristics.



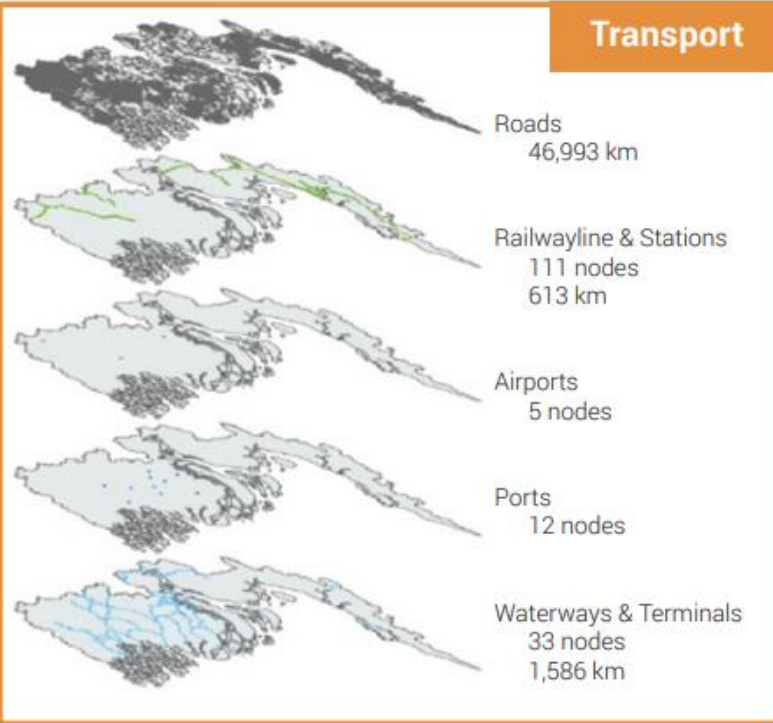
### Part 2: Calculating economic damage to infrastructure systems

Through stakeholder consultation and analysis of key national documents, assess how household service disruptions affect progress towards attaining relevant SDGs.

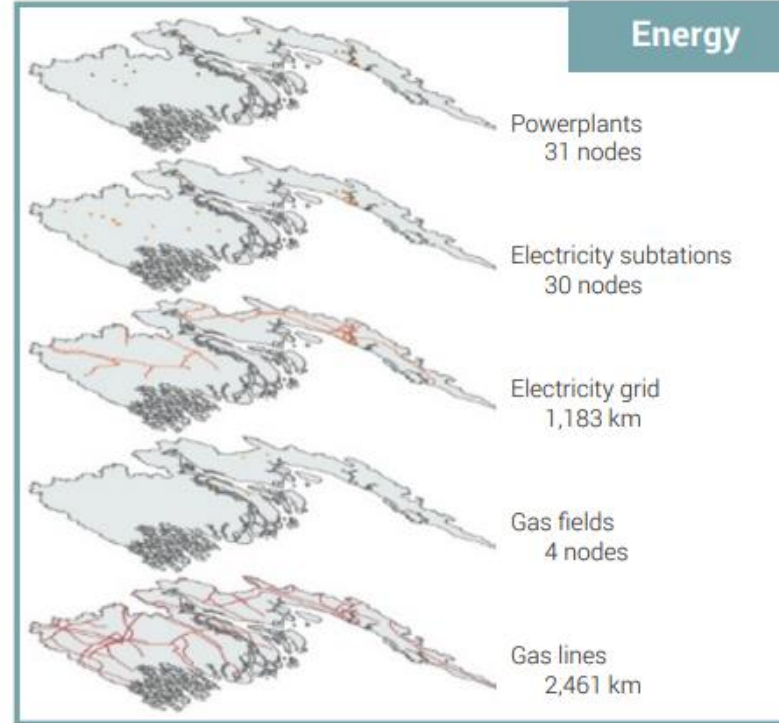


# Focus on Bangladesh Coastal Zone across assets

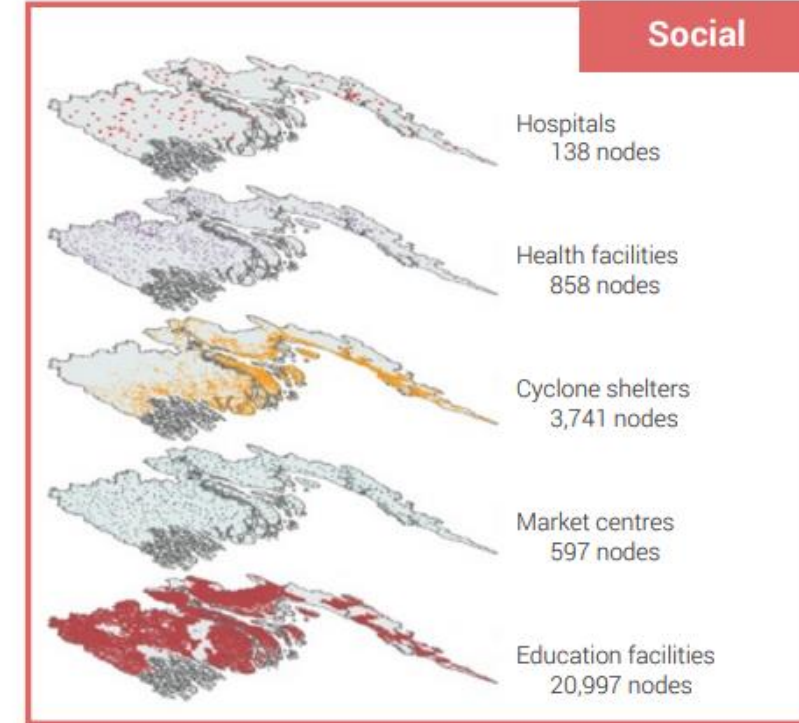
## Transport



## Energy

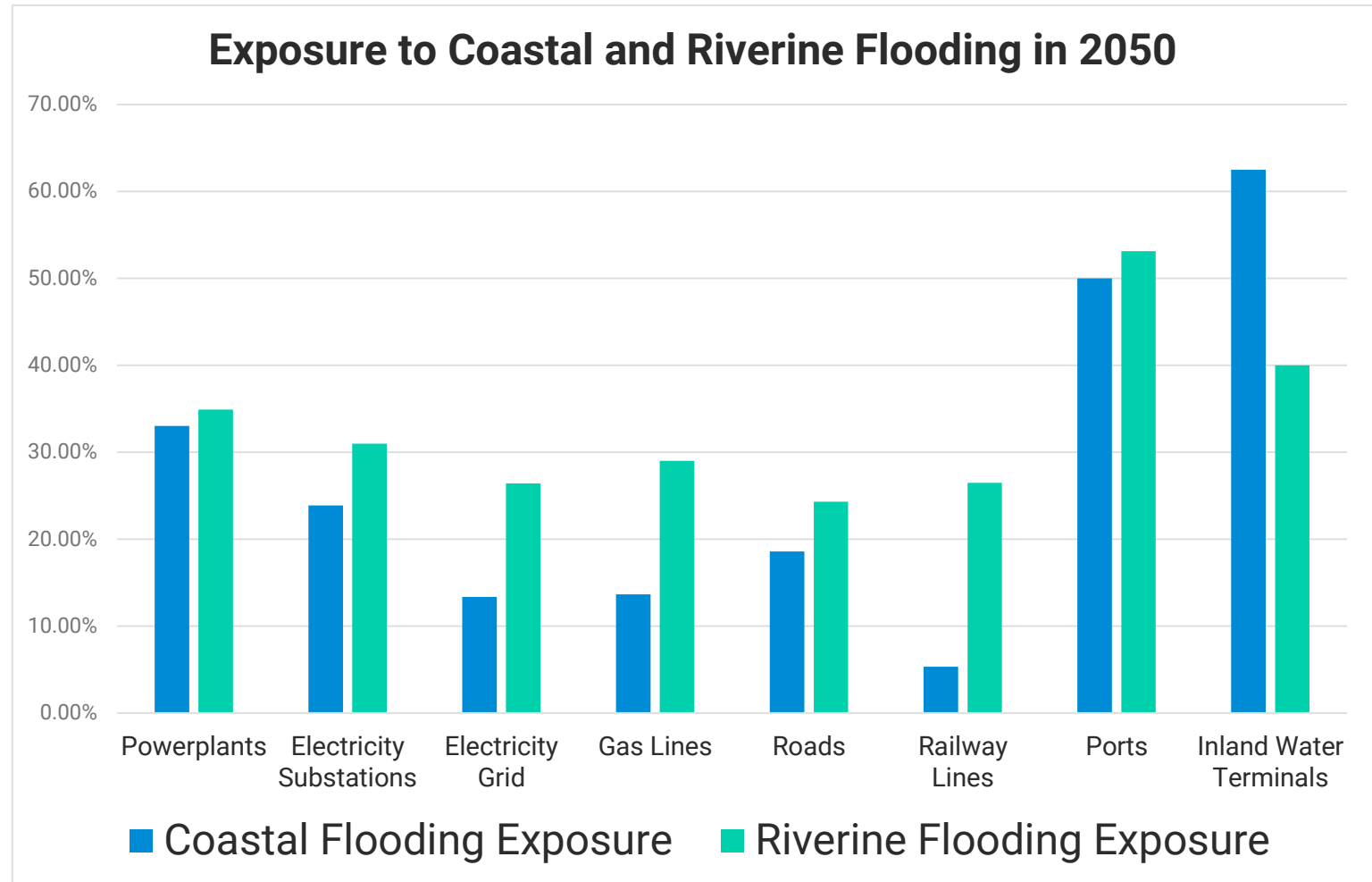


## Social



# Results: Quantifies Exposure to Climate Hazards...

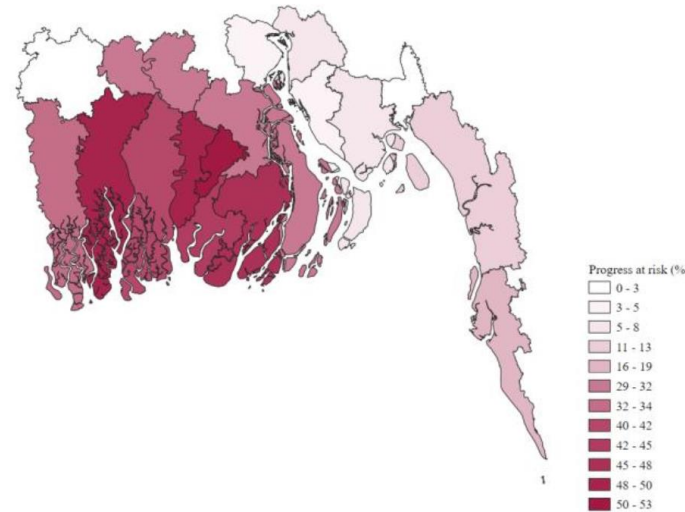
- Coastal flooding event **likely to cause €9.13 billion of economic damage annually**
- Riverine flooding event **likely to cause €7.63 billion of economic damage annually**



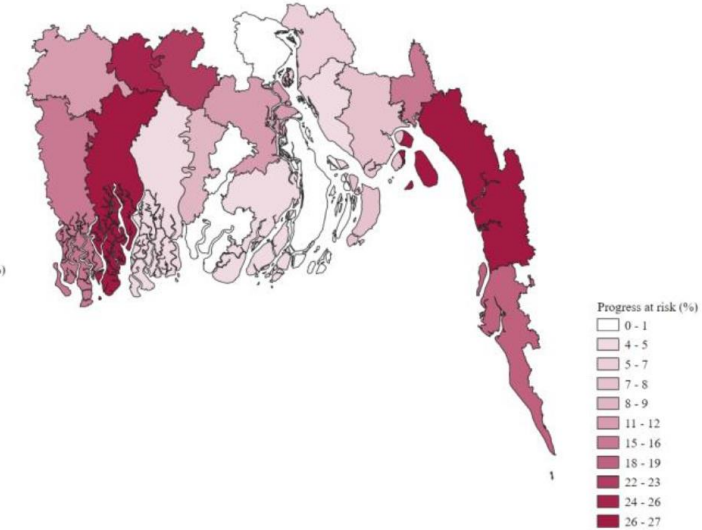
# ... with Cascading Affects to Households and SDGs

- In rural Bangladesh, the poorest are the most impacted.
- 100% of the almost 9 million households are impacted by at least one climate hazard.
- Climate change and impacts to infrastructure systems is putting at risk sustainable development goals.

Coastal flooding



River flooding

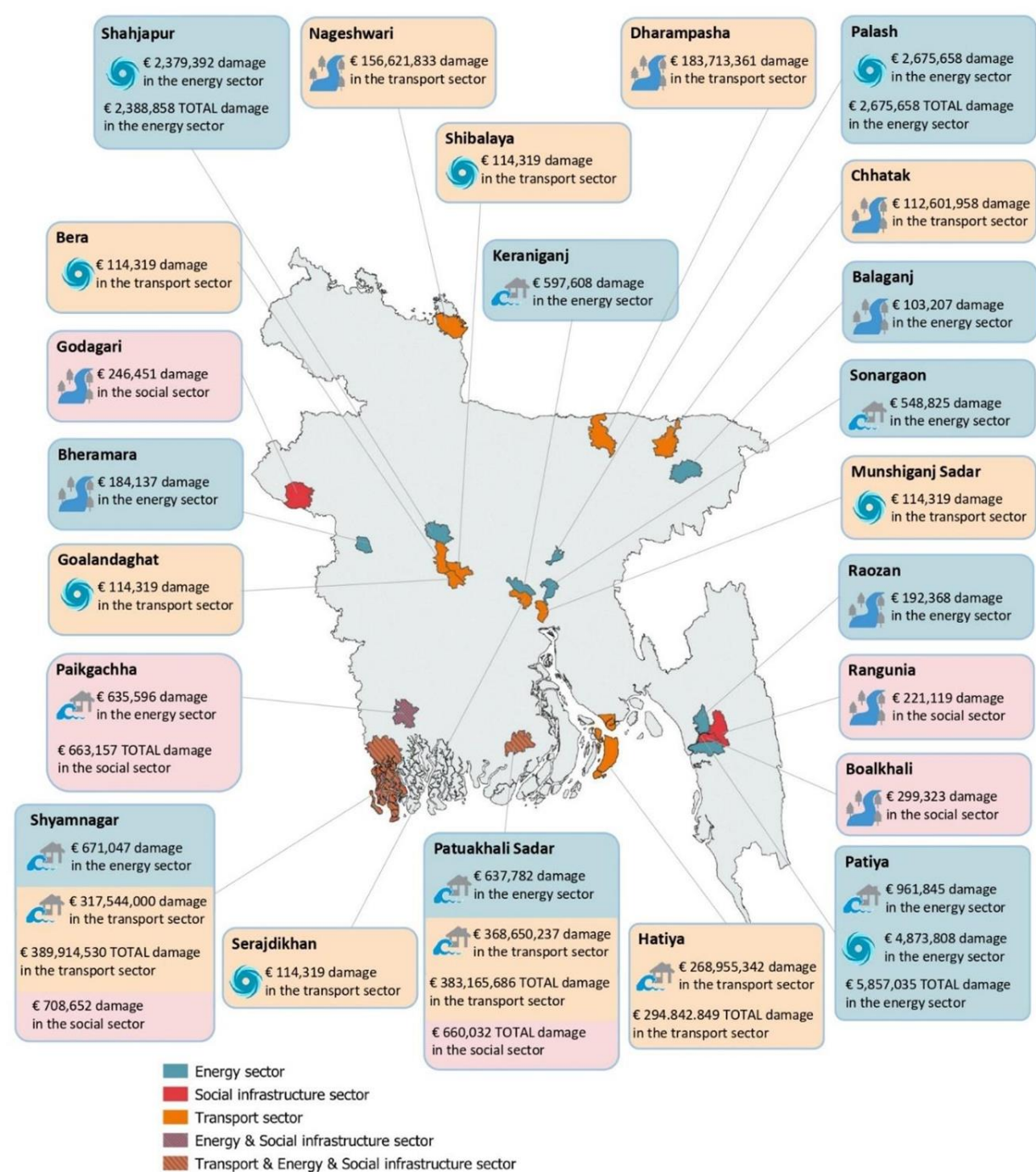


**Impact on Decent work and economic growth  
sustainable development goal**



# Key Upazilas at risks with priority adaptation options to consider for Bangladesh's infrastructure

- Several coastal upazilas most severely impacted: **Shyamnagar** expected to experience damage of ~€390million , **Patuakhali Sadar** ~€385million, and **Hatiya** ~€295million to transport sector
- Social infrastructure sector is most impacted in several coastal upazilas, including **Shyamnagar** where damages are expected to be ~€710,000, **Paikgachha** ~€663,000, and **Patuakhali Sadar** ~€660,000
- Further consultation ongoing to support prioritisation and integration in Plans and Policies





# Lesson Learned and Way Forward

- **Stress-test provides insights at the national level. Locally-led identification and prioritization is also needed** for successful implementation of interventions in the hotspots of risks identified.
- **Climate change has impacts across infrastructure sectors... and more broadly across sectors.** Need to be addressed in an integrated manner across national and sectoral plans and policies.
- **Building institutional capacity remains key** for stakeholders to have the tools and methods to include climate change risks within their projects planning, design, and implementation.

# Related Links

- [National Adaptation Plan of Bangladesh](#)
- [Mujib Climate Prosperity Plan](#)
- [Bangladesh Delta Plan 2100 & Online Knowledge Portal](#)
- [GCA's Global Hub on Locally Led Adaptation](#)
- [Webinar Recording](#)



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