



RETREAT OR REINFORCE? TWO CONTRASTING COASTAL ADAPTIONS TO RISING SEA LEVELS

Netherlands

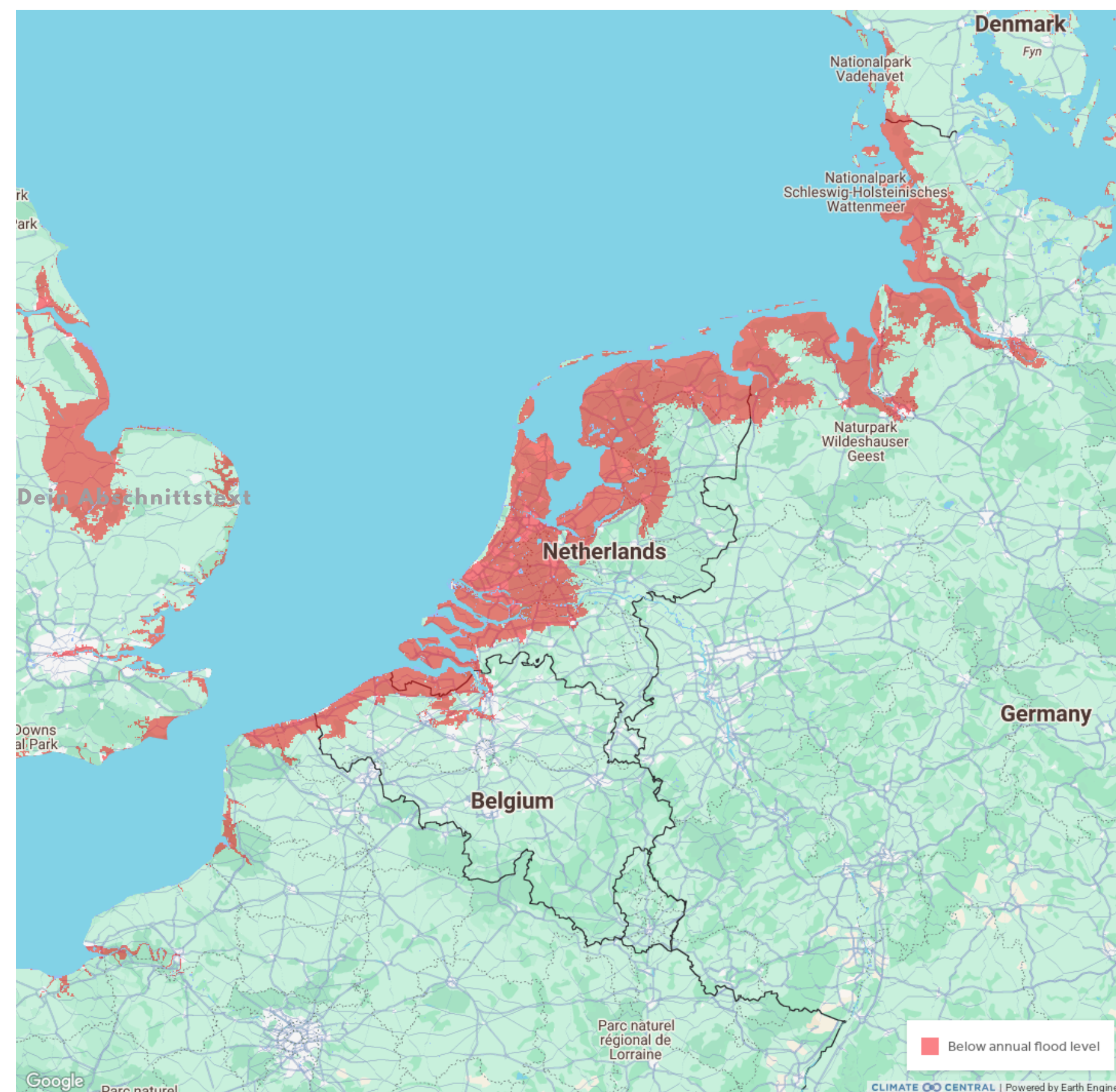
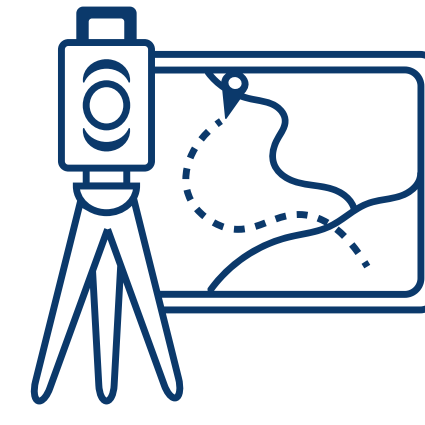


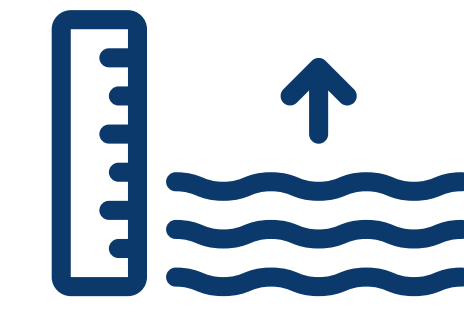
Fig. 1: Areas in the Netherlands and neighboring countries below the annual flood level shaded in red.

> 400 km coastline ^[8]



~ 580 km coastline

~ 1/3 of the country
below sea level ^[8]



~ 2/3 of the country
below sea level ^[6]

rise up to 1.2m by
2100 ^[8]

rise: up to 1.1 m by
2100 ^[5]

2/3 of population live in
flood-prone
areas ^[8]



60% of population
live in flood-prone
areas ^[6]

Bangladesh

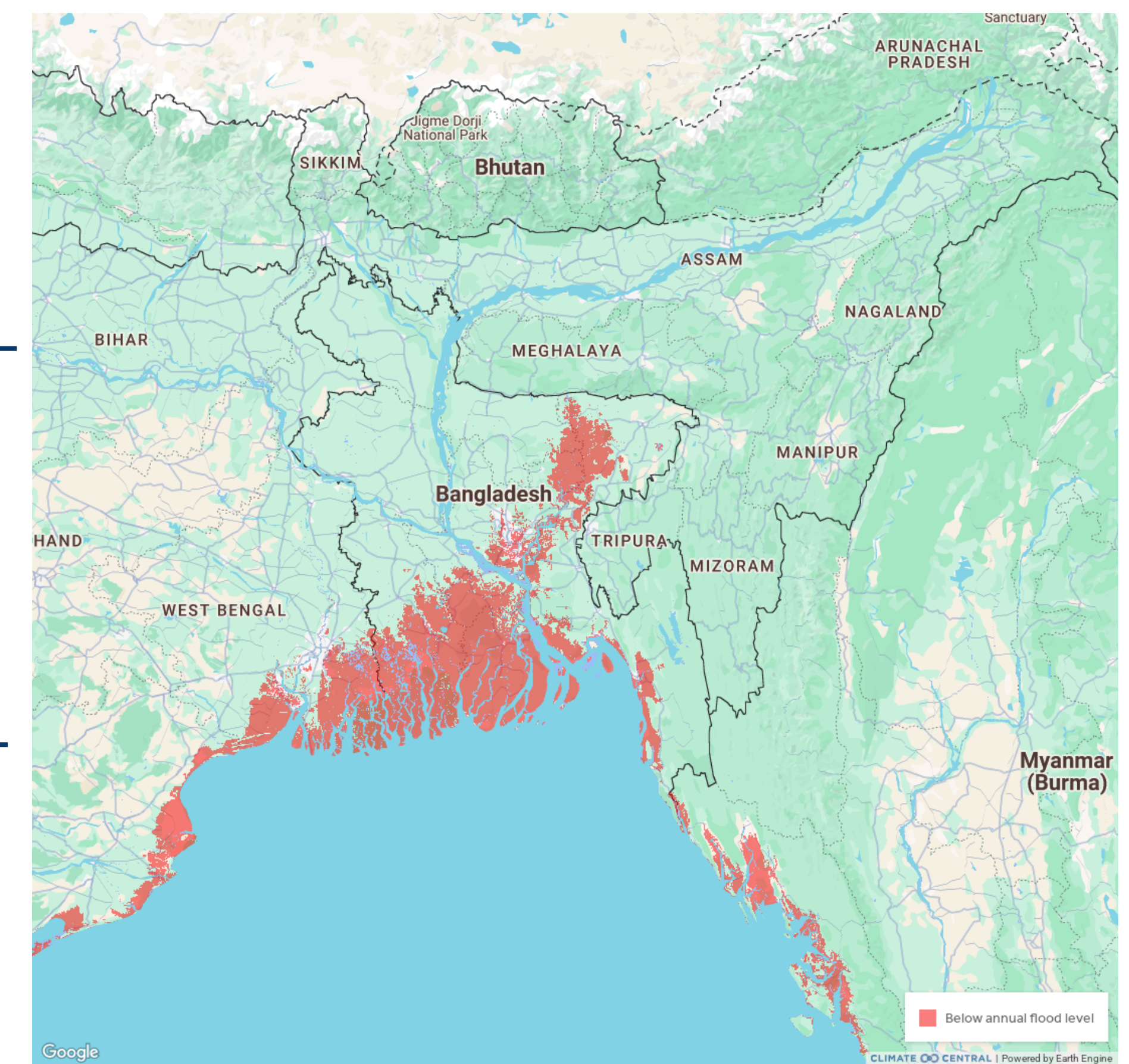


Fig. 2: Areas in Bangladesh and neighboring countries below the annual flood level shaded in red.

Vulnerability ^[4,7]

- Drainage of polsters promote subsidence and relative sea rise
- Salinisation of land
- Resistance from interest groups
- Estimated 13 billion Euro deficit until 2050

Grey Engineering

Delta Programme ^[4,8]

Vision

Concrete annual measures to secure protection, supply of fresh water and climate-resilience.

Focus Areas

- Closure of most sea inlets and lagoons
- Sand nourishment to mitigate deficit
- Shorten coastline, gain land
- Delta Works, including engineering mega-projects



Fig. 3: Storm surge barrier protecting Rotterdam

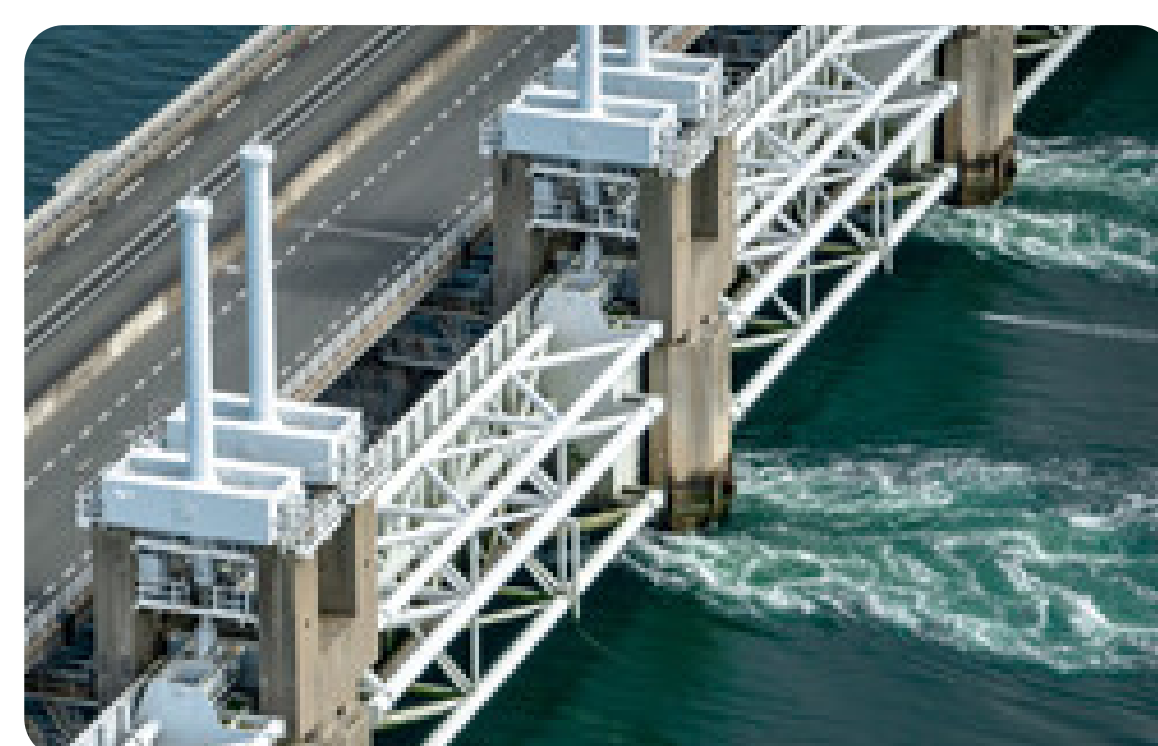


Fig. 4: Oosterscheldekering: biggest dutch storm surge barrier

Future Approaches ^[9]

- Shift to mitigating effects of potential flooding rather than fighting against the water
- Combination of grey and green infrastructure

Vulnerability ^[3,5]

- Monsoon and Cyclone region
- Temperature rise: +0.2 °C/decade
- Embankments often fail
- 60% of coastal residents depend on agriculture
- Climate-induced rural-urban migration overwhelms cities
- Lack of institutional coordination & awareness

• Climate change intensifies salinity, flooding, erosion, displacement, and waterlogging

Green Engineering

Bangladesh Delta Plan 2100 ^[1]

Vision

Secure long-term water, food, and climate resilience for the delta.

Focus Areas

- Coastal embankment upgrades
- Climate-smart farming
- Urban flood & waste planning
- Tidal River Management (TRM)

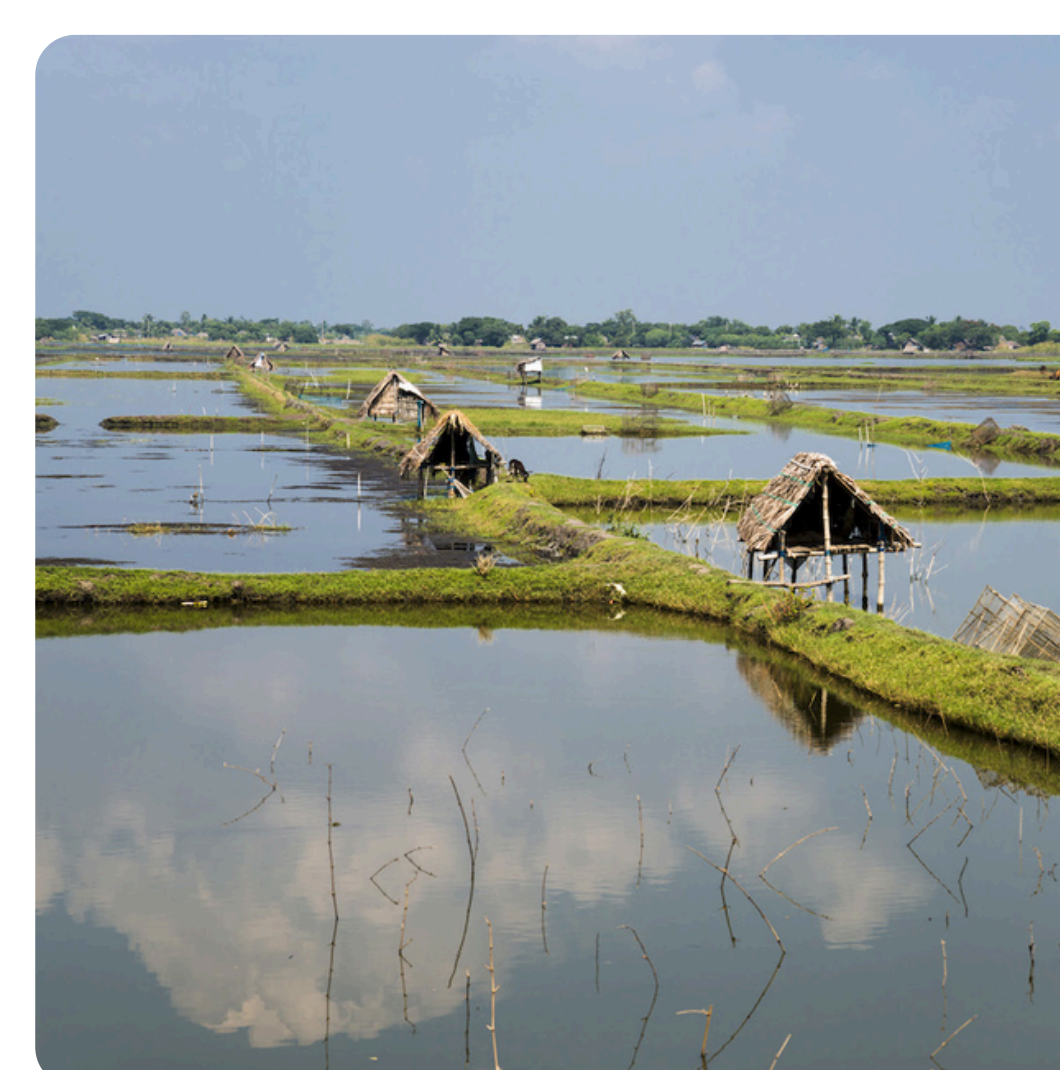


Fig. 5: Innovative ecosystem based water- and landuse

Future Approaches ^[3,5]

- Salinity-tolerant crop rotation (RVCC project)
- Aquaculture spread → increases salinity
- Cyclone shelters, early warning systems, mangrove reforestation

• Adaptation is occurring, but often reactive, uncoordinated, or NGO-led

While the Netherlands invests in engineered defenses and Bangladesh relies on locally driven measures like embankments, both face limitations that highlight the need for socially, ecologically, and institutionally integrated adaptation strategies. ^[2]

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