



PBL Netherlands Environmental
Assessment Agency

THE GEOGRAPHY OF FUTURE WATER CHALLENGES

BENDING THE TREND



PBL Netherlands Environmental
Assessment Agency

webinar Integrated Coastal Zone Management

The Geography of Future Water Challenges

BENDING THE TREND

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From challenges to solutions

Part 1 Setting the scene

Part 2 Exploring future pathways

River basins

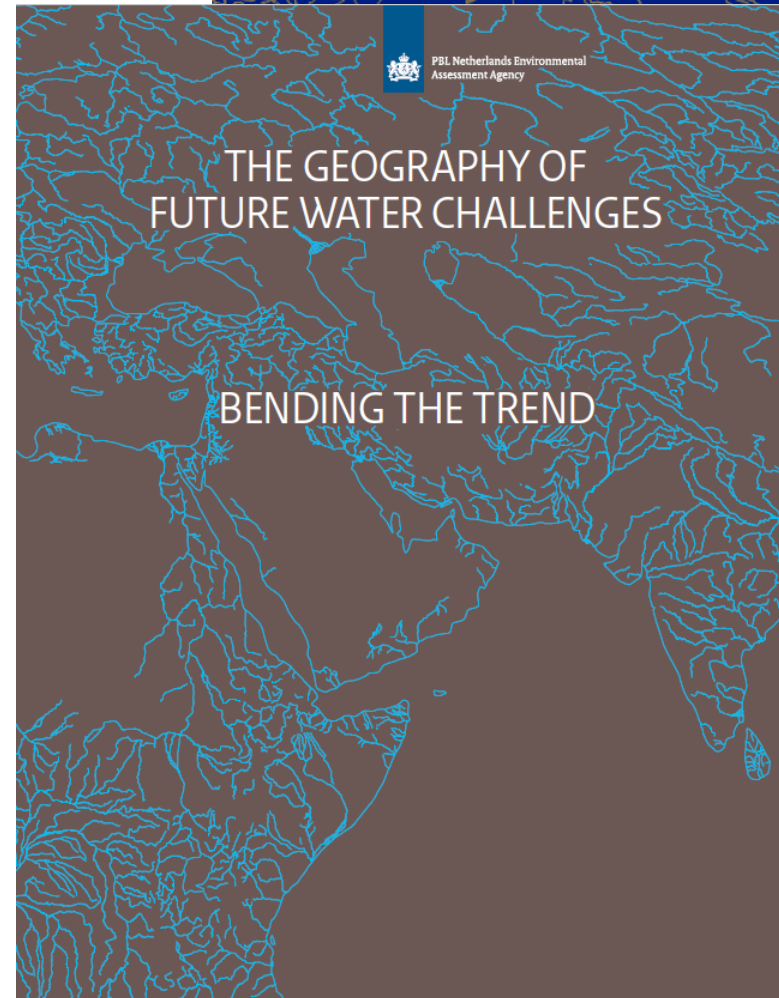
Deltas and Coasts

Drylands

Cities

Part 3 The global picture

Part 4 The way forward



Deltares

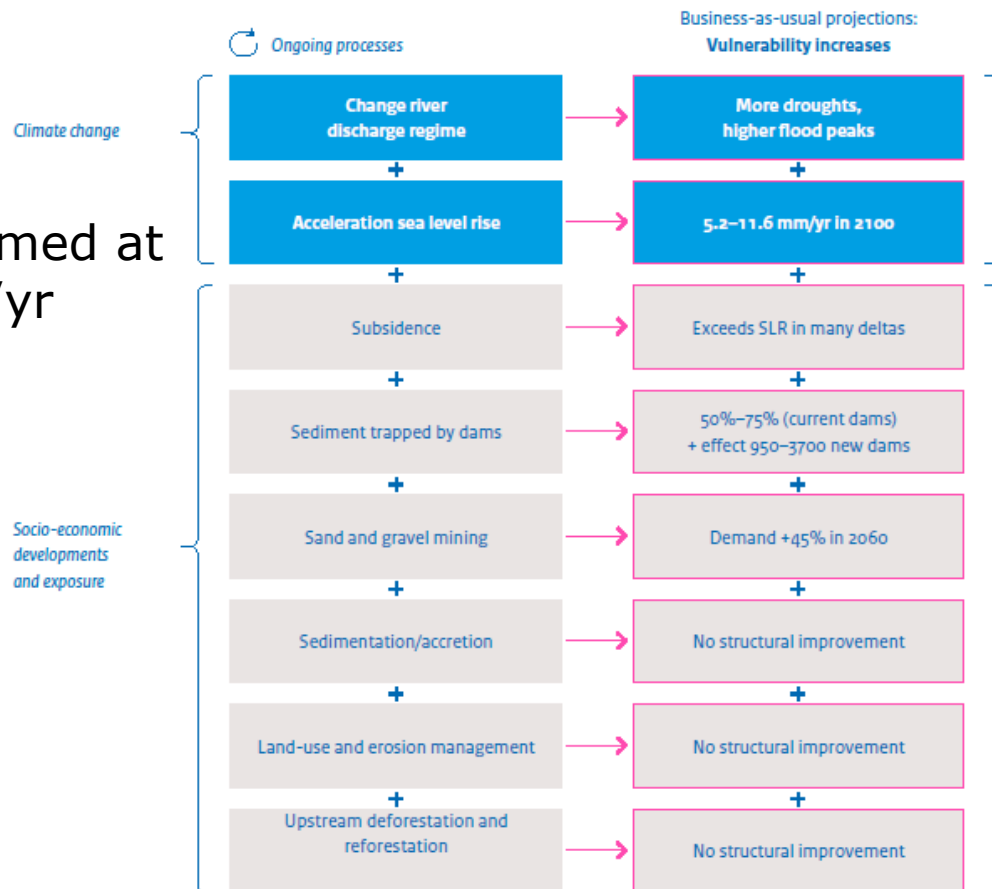


De Waterwerkers

Today: all signs for deltas are on red

Diagnosis: overview of future trends of critical drivers for deltas

PAST:
Deltas formed at
5-10 mm/yr



IPCC 2021:
 ➤ 1.5° or 2° C target increasingly uncertain
 ➤ Weather extremes intensify beyond model projections



FUTURE
Do we start losing our deltas this century?

IPCC 2022:
 ➤ No signs of adequate adaptation responses
 ➤ Spatial developments increase exposure
 ➤ Hardly transformational approaches found

Source: PBL

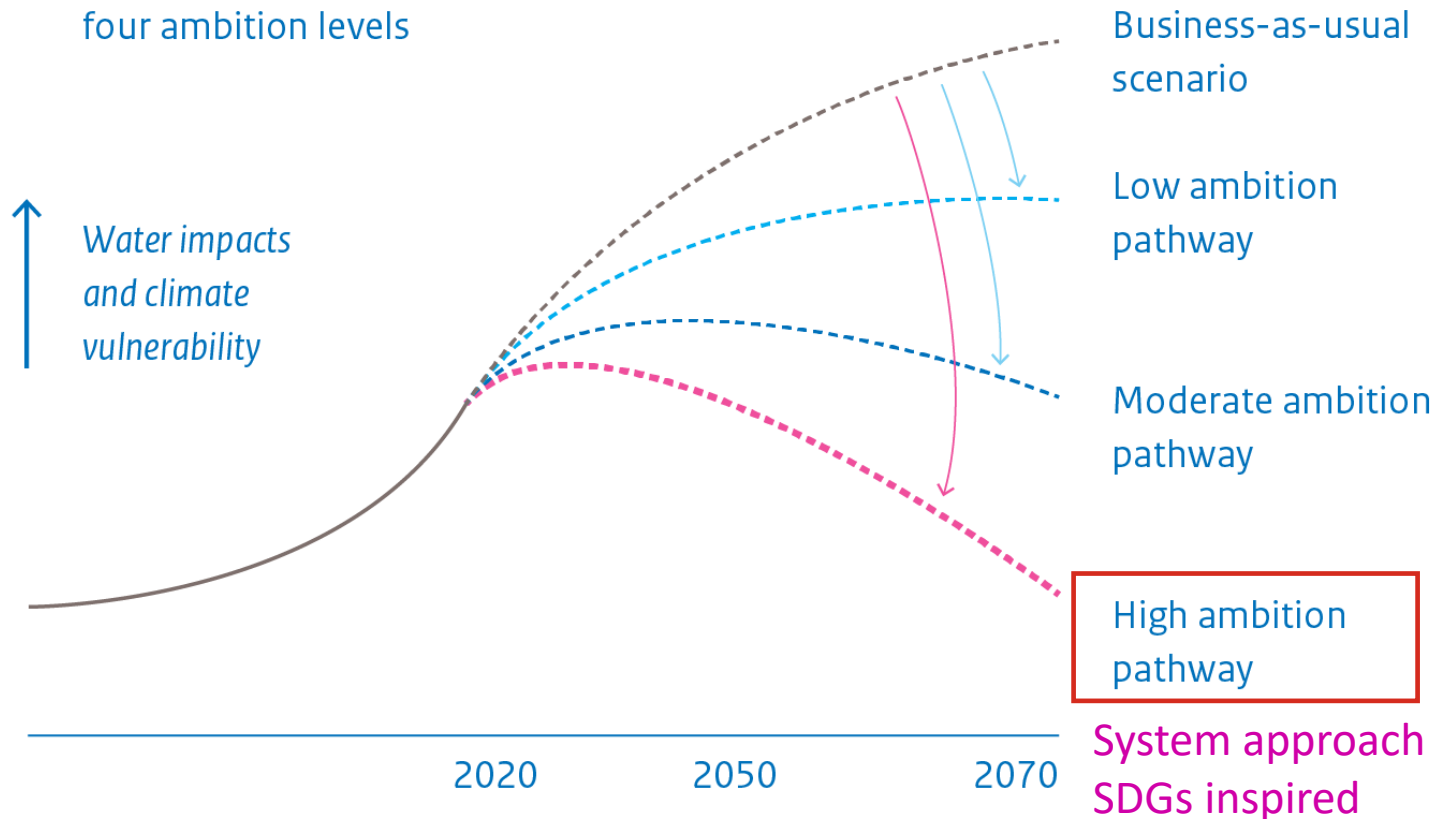


Bending the trend: exploration of future pathways of solutions

SSP2/RCP6.0

Bending the trend

Exploring solutions with four ambition levels



Source: PBL

Eight main water themes

- Water use and crop production
- Water pollution, sanitation and wastewater treatment
- Flooding from sea and rivers
- Hydropower
- Subsidence
- Ecological quality
- Water, displacement and conflict
- Water and climate resilient urban development



Our starting point: system approach based on four hotspot landscapes

River basins

- Upstream dams
- Sediment flows and mining
- Upstream water use
- Upstream water pollution
- Melting glaciers

Drylands



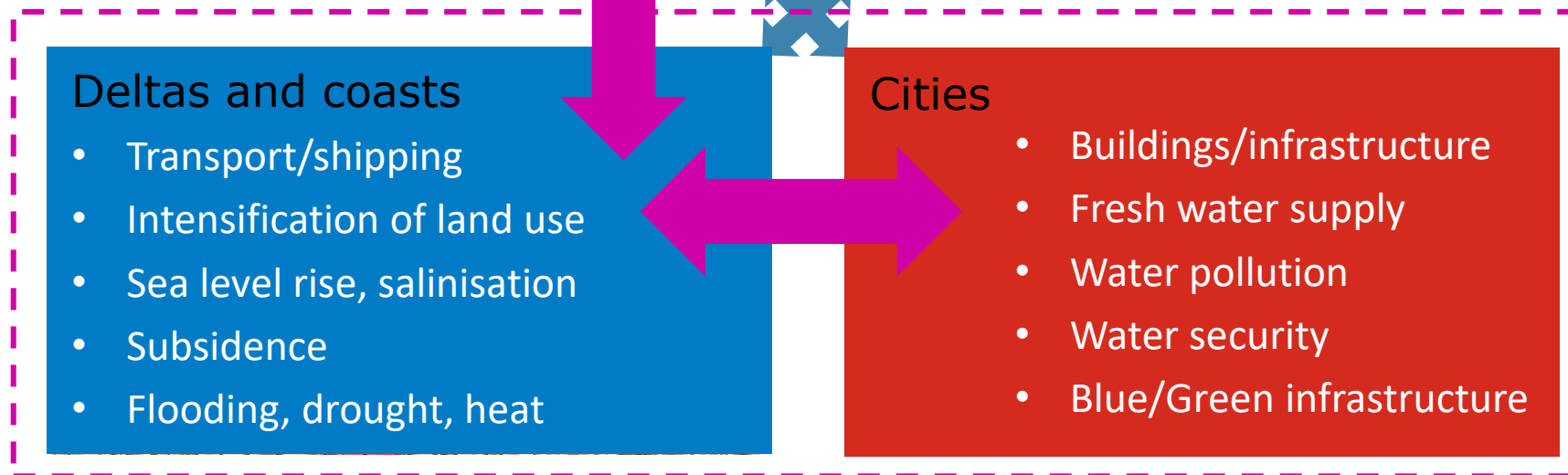
Deltas and coasts

- Transport/shipping
- Intensification of land use
- Sea level rise, salinisation
- Subsidence
- Flooding, drought, heat

Cities

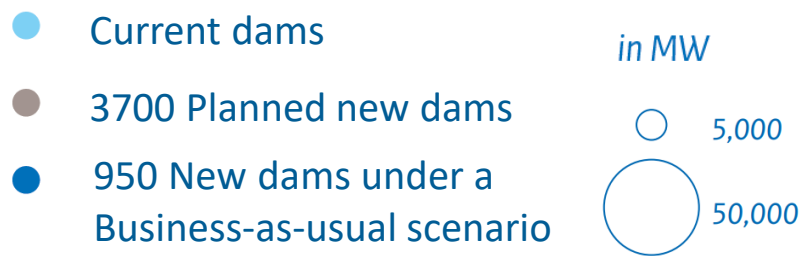
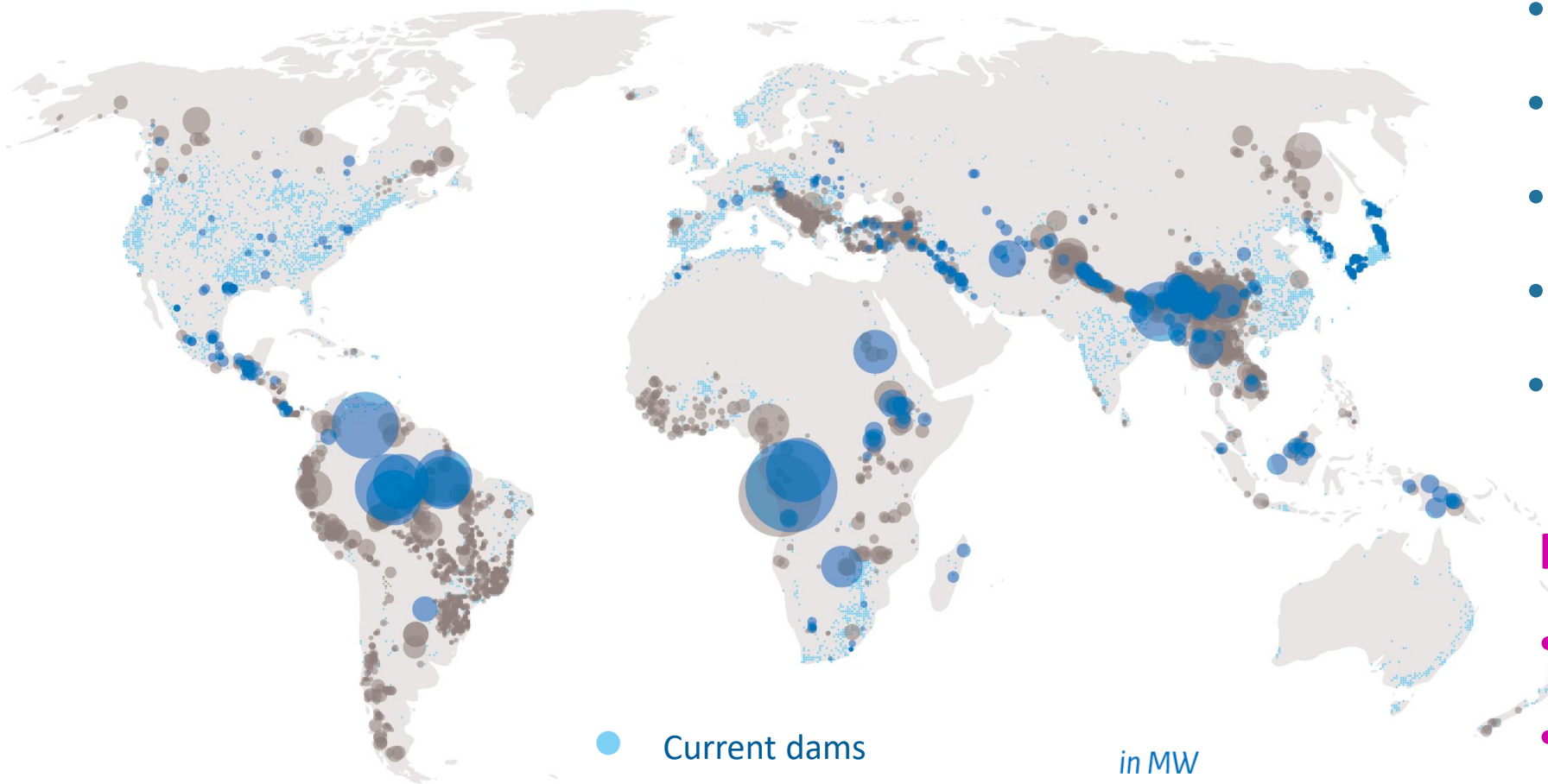
- Buildings/infrastructure
- Fresh water supply
- Water pollution
- Water security
- Blue/Green infrastructure

Long-term sustainability of deltas and coasts requires a coherent and adaptive long-term strategy, also addressing upstream challenges.





Deltas and Coasts: upstream many more dams likely to be built



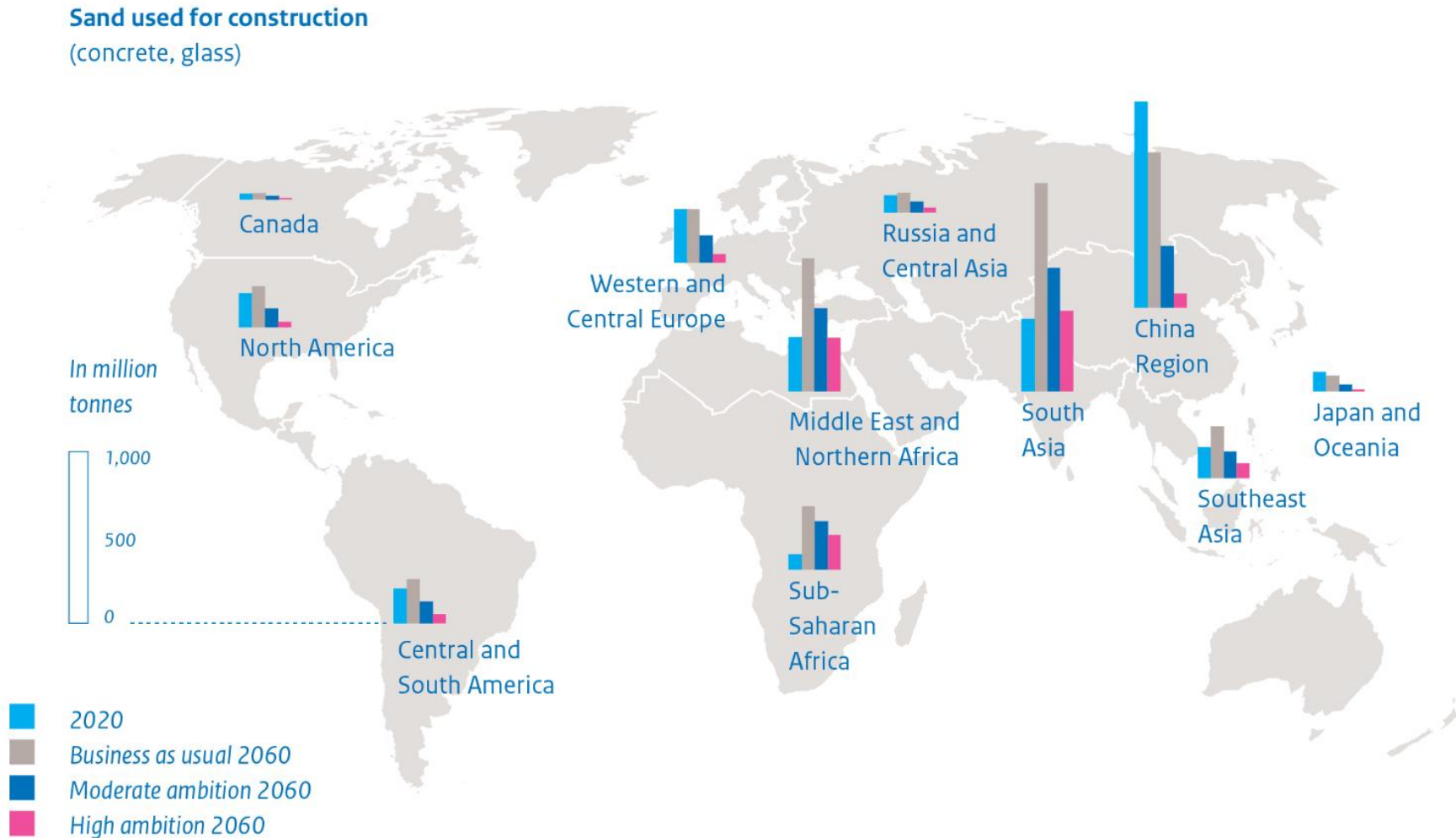
Negative implications for:

- water dynamics
- sediment flows
- fish migration
- ecological quality
- transboundary tensions

High ambition pathway

- Stand-still approach
- no large new dams
- >2100 small new hydropower facilities

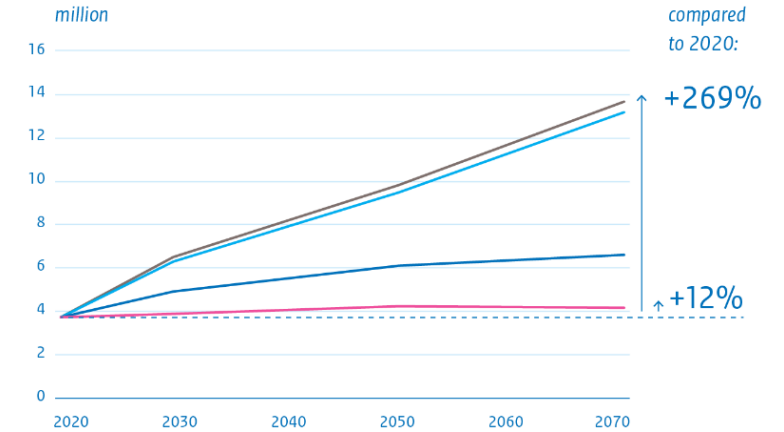
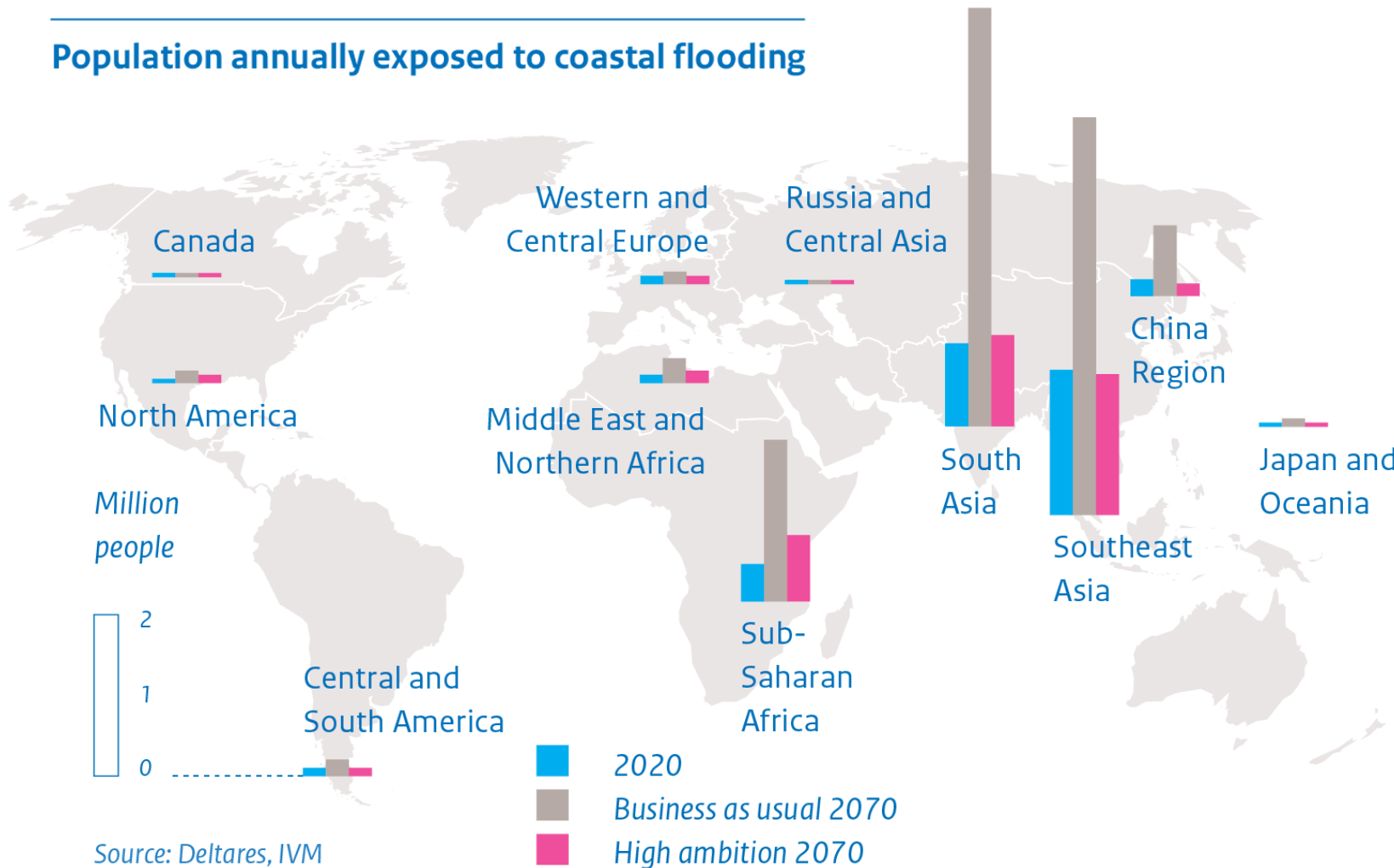
High demand for sand and gravel for construction negatively affects sediment flows to the deltas and coasts.





High ambition pathway: population exposed to coastal flooding can be strongly reduced

Population annually exposed to coastal flooding



- Business as usual
- Low ambition
- Moderate ambition
- High ambition

Cities are hotspots of exposure: high urgency to adapt

2 Billion people live in deltas, coastal zones, islands, many of them in cities



Water and climate should be on any table

○ 1 million
○ 10 million



Source: PBL



Buenos Aires
From 14.4 million in 2020 to 15.6 million in 2070

Dhaka
From 21.0 million in 2020 to 39.9 million in 2070

Istanbul
From 17.1 million in 2020 to 20.6 million in 2070

Shanghai
From 20.7 million in 2020 to 23.6 million in 2070

Mumbai
From 17.1 million in 2020 to 28.6 million in 2070

Karachi
From 16.2 million in 2020 to 28.1 million in 2070

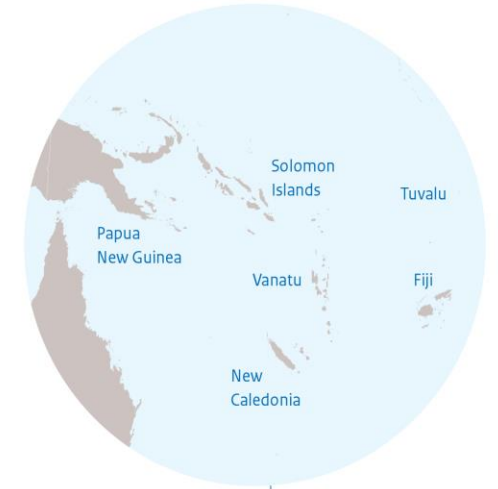
Jakarta
From 10.7 million in 2020 to 12.4 million in 2070

Mauritius

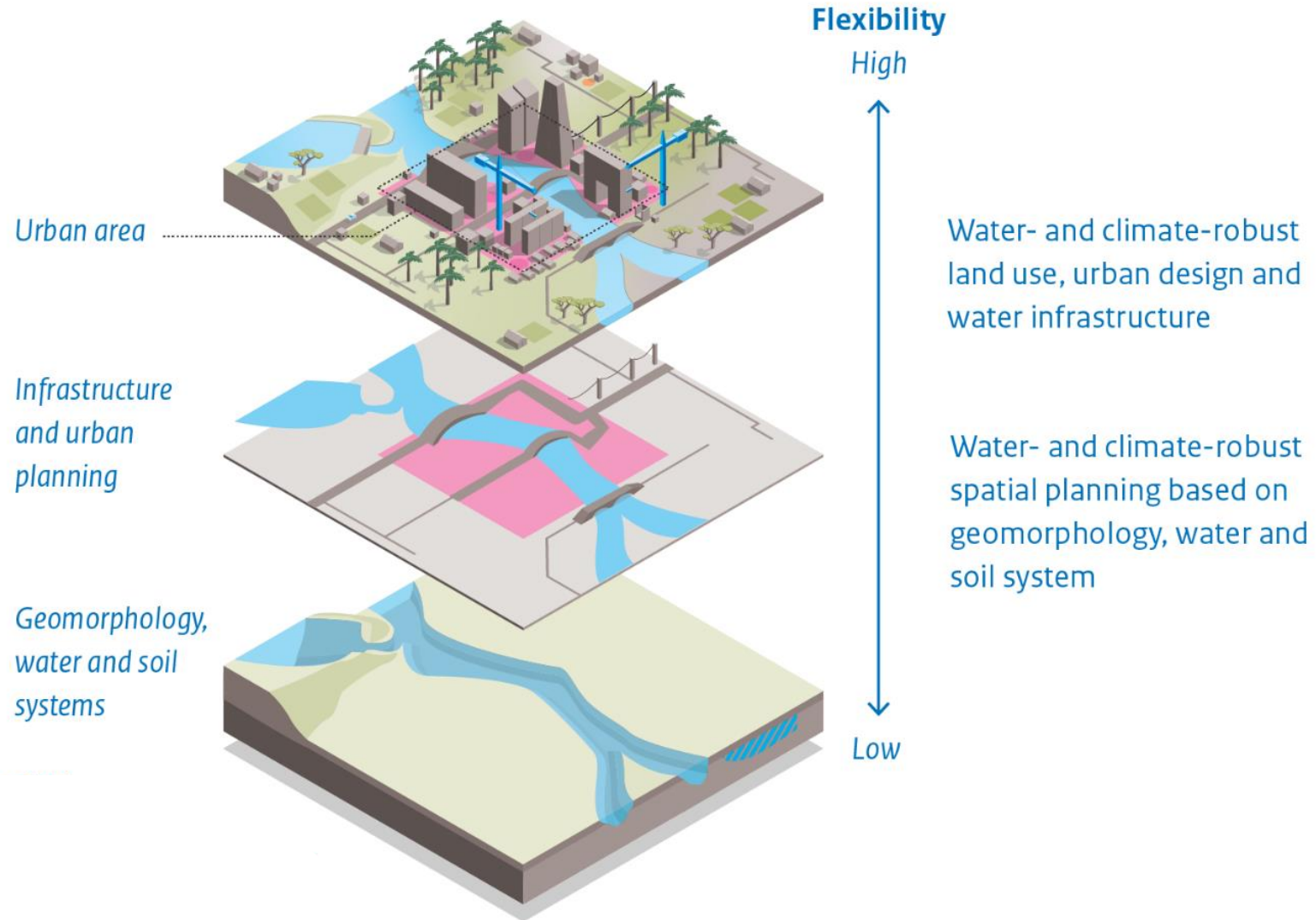
Maldives

■ Population in delta and coastal cities in 2020
■ Population increase in delta and coastal cities in 2070

○ 1 million
○ 10 million



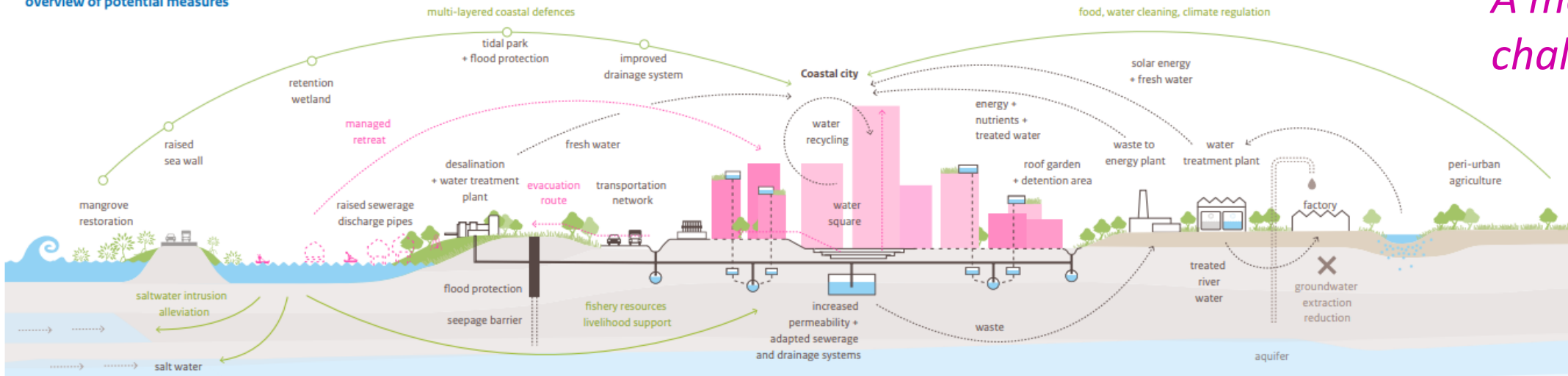
Sustainable cities: water and soil systems should be leading



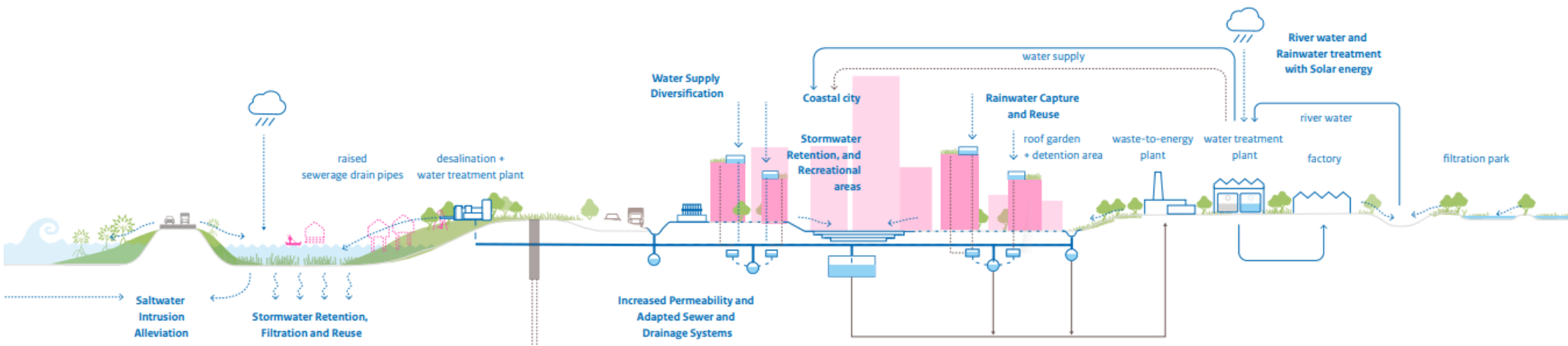
Sustainable cities: water and soil systems should be leading



Cities in deltas and coastal landscapes:
overview of potential measures



A major design challenge





Overall conclusions: the high ambition pathways makes the difference

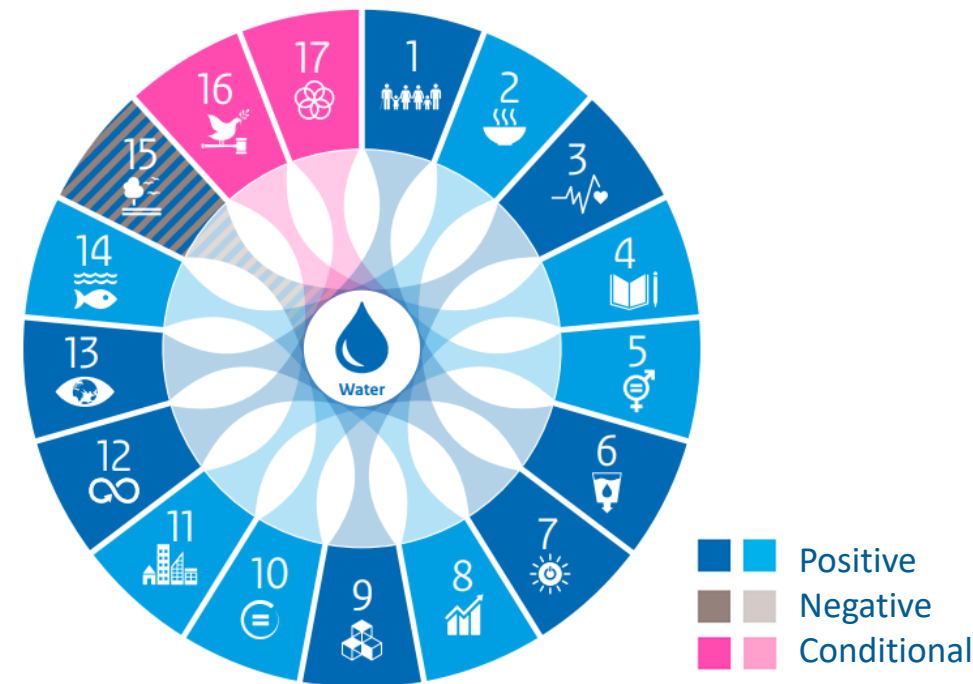
- Flood risks, water use and subsidence can be strongly reduced
- Maybe 950 up to 3700 new dams upstream: further decrease of sediment flows can be halted (*stand-still*)
- Nutrient emissions to coastal seas can be reduced and ecological quality improved
- Many co-benefits for the SDGs
- ***The water sector cannot do it alone!***



SDGs, Business-as-usual scenario 2070



SDGs, High ambition pathway 2070

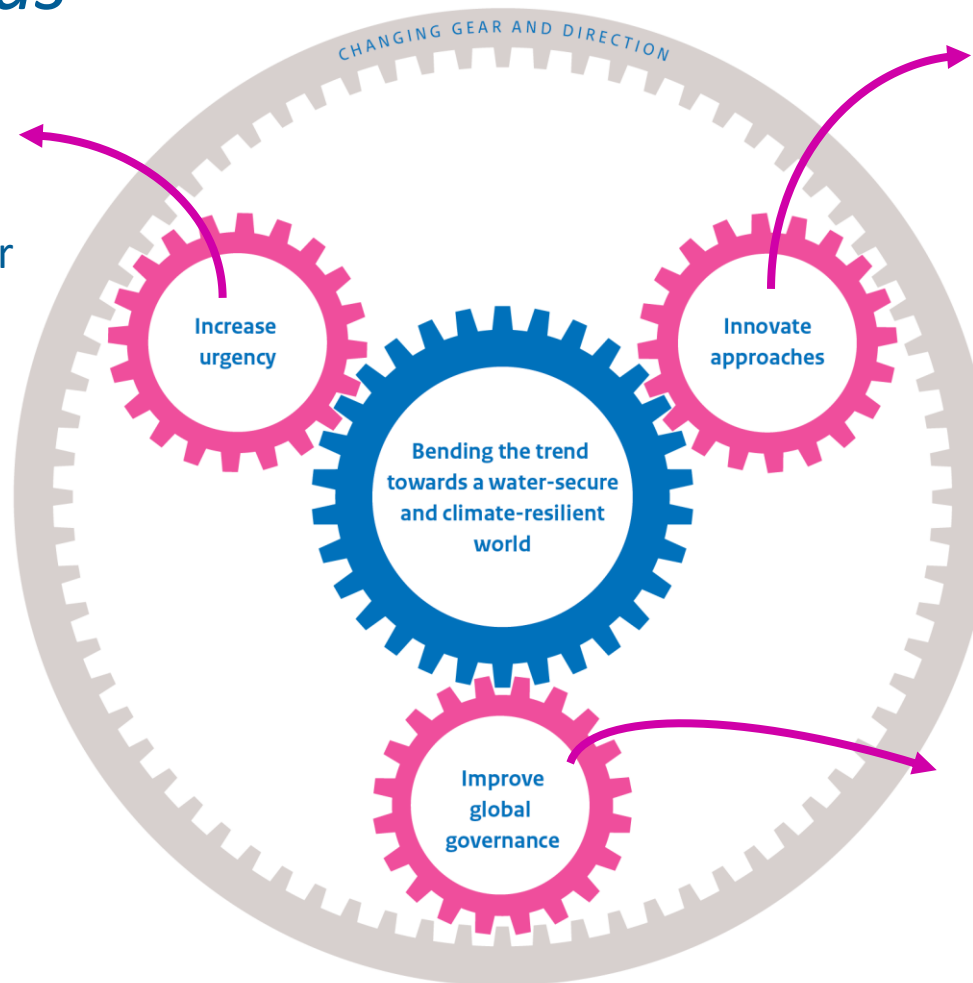




The way forward; radically different policies required: *Three focus areas: nine turnarounds*

Increase urgency

1. Acknowledge the value and pivotal role of water
2. Valuing water: beyond economic efficiency
3. Act now, but think and plan way beyond 2030



Innovate approaches

1. Adopt a river-basin and eco-system based approach
2. Develop a high ambition pathway
3. Improve policy coherence across sectors

Improve global governance

1. Strengthen the global governance
2. Scale up and align global funds
3. Build a shared water agenda



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We have to act now!

*If we wait for the perfect knowledge and time,
we will become specialists in waiting ...*

QR report

