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enabling delta life

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Resilient urban water systems for citizens and communities

Cases of good adaptation practices in urban deltaic regions

Hans Gehrels

Global lead on urban resilience

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Contents

- Emerging trends and challenges
- Good practices and approaches
- Methods and tools
- Conclusion

Emerging trends and challenges

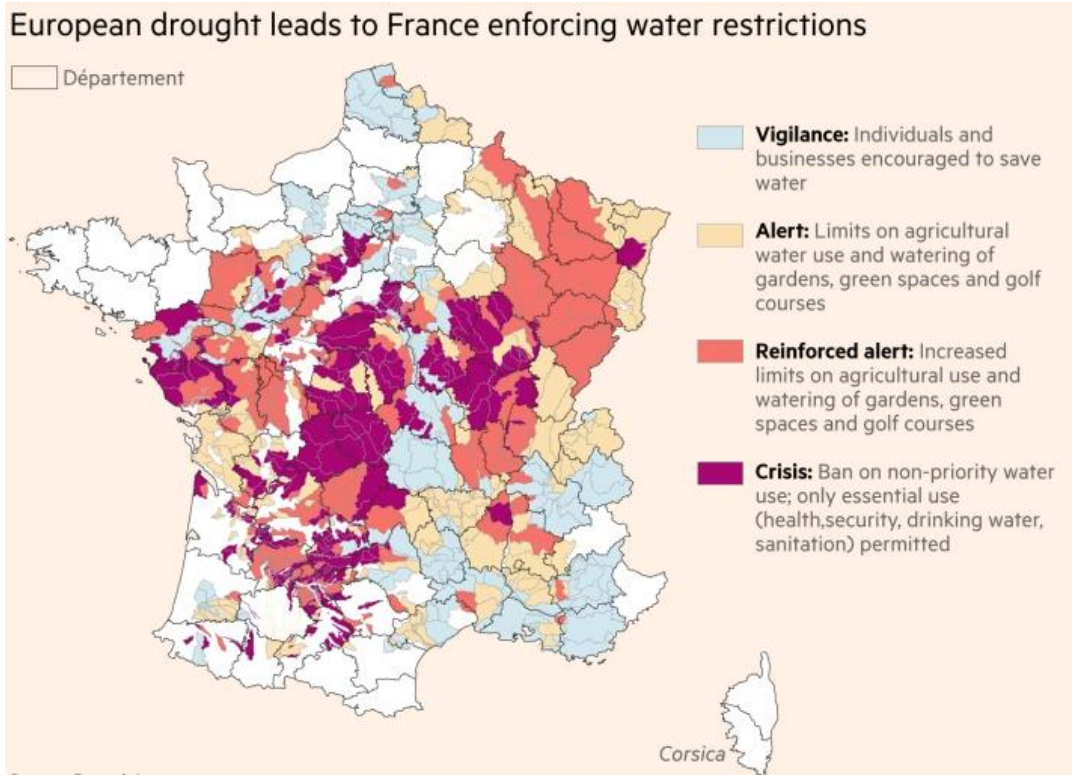
- Urbanization (megalopolises in Africa and Asia)
- Disruptive technology development (AI, ML, …)
- Geopolitical transitions and shifting centers of gravity
- Acceleration of climate change (droughts, floods, heat, forest fires)

Aerial view of urban sprawl in and smog in Mexico City. Photo: Richard Ellis/Alamy; Guardian, 19 Mar 2018

Flooding in Belgium, Germany and The Netherlands

From: Het Belang van Limburg: "Als de waterbom in Vlaanderen valt: wat gaat dat kosten?"

Water scarcity and drought in France and Italy



Water shortages and heatwaves: Europe confronts changing climate, Financial Times, 18 August 2020

Italy has declared a state of emergency because of drought, CNBC, 5 July 2020

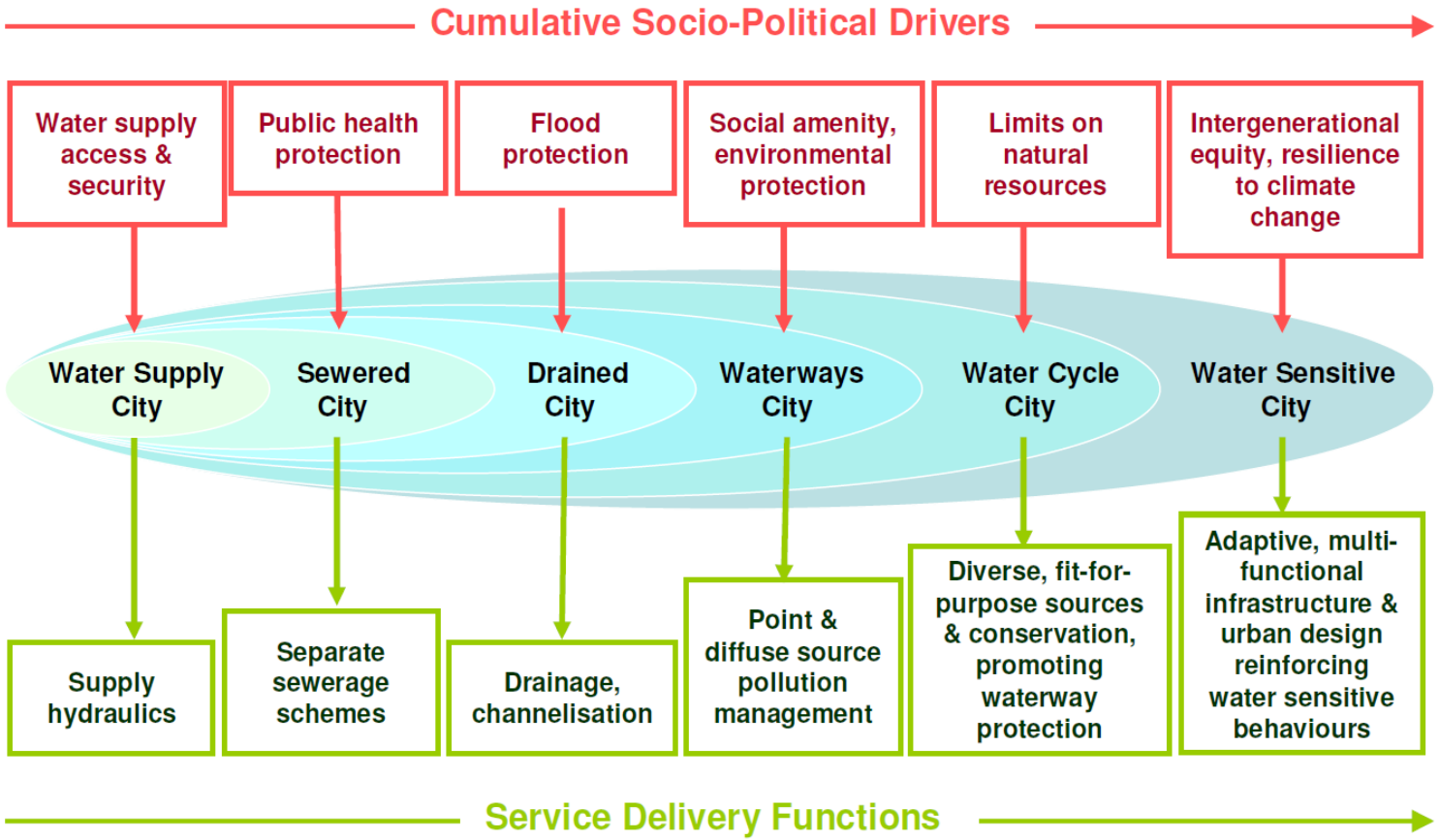
Good practices and approaches

THE GREEN VILLAGE

Approaches towards urban resilience

Requirements for any approach:

- Systems approach
- River basin perspective
- Integrated
- Inclusive
- Equitable
- Place-based
- Community-based
- Nature-based
- Climate adaptive
- Safe
- Resilient
- Sustainable



Brown et al 2008. Transitioning to Water Sensitive Cities

Singapore’s Active, Beautiful, Clean Waters Programme

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Amsterdam Rainproof

- Gebouw
- Dak
- Tuin
- Straat
- Plein
- Buurt

Aan de slag in de tuin

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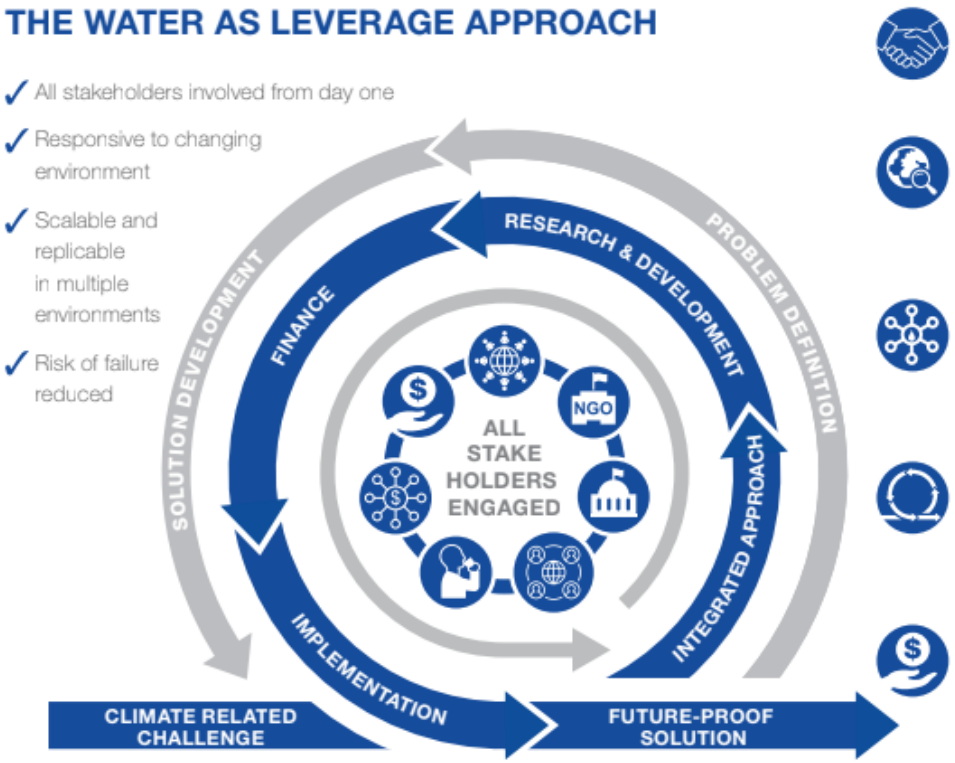
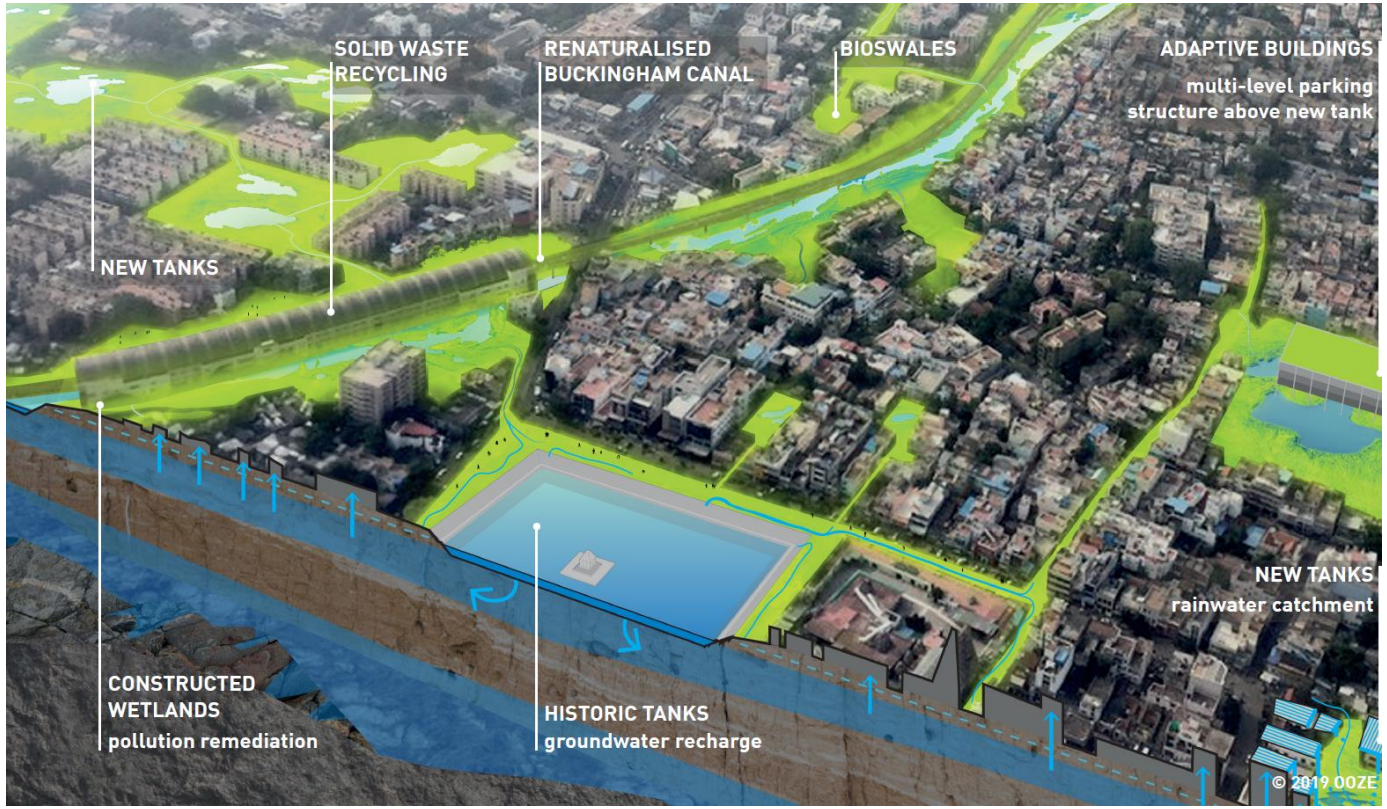
Water as Leverage

Integrated and inclusive methodology for transformative, design-driven solutions to urban water and climate challenges during pre-project preparation towards implementation





Design: City of 1000 Tanks, Chennai, India. OOZE Architects, 2019

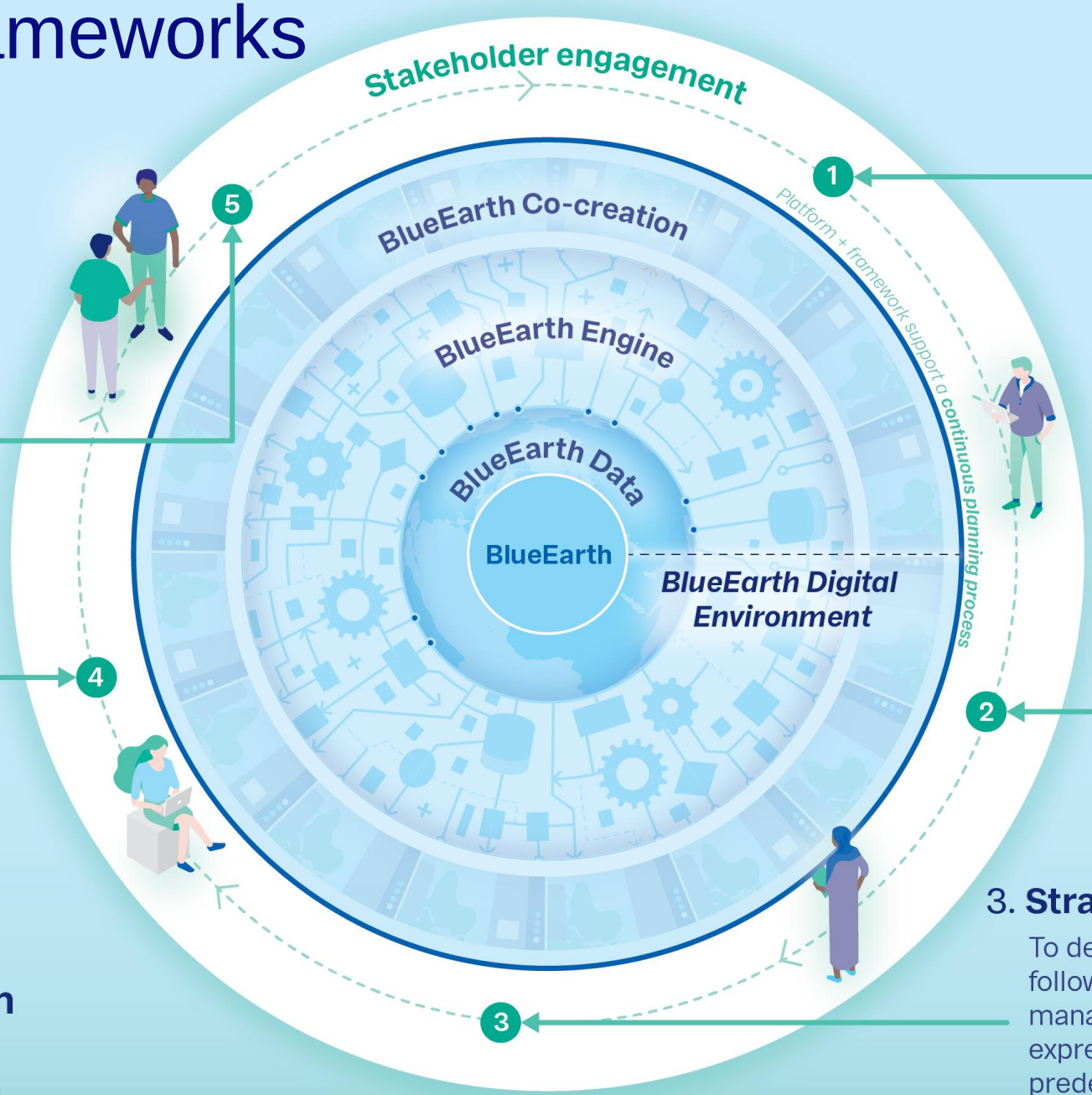
Methods and tools

Photo: Cynthia van Elk

Analysis frameworks

5. Implementation

To implement the measures, including monitoring and evaluation.



1. Inception

To identify the decision context and to set objectives and criteria.

2. Situation analysis

To describe the present and future water resources system expressed in socio-economic effects.

4. Prepare for implementation

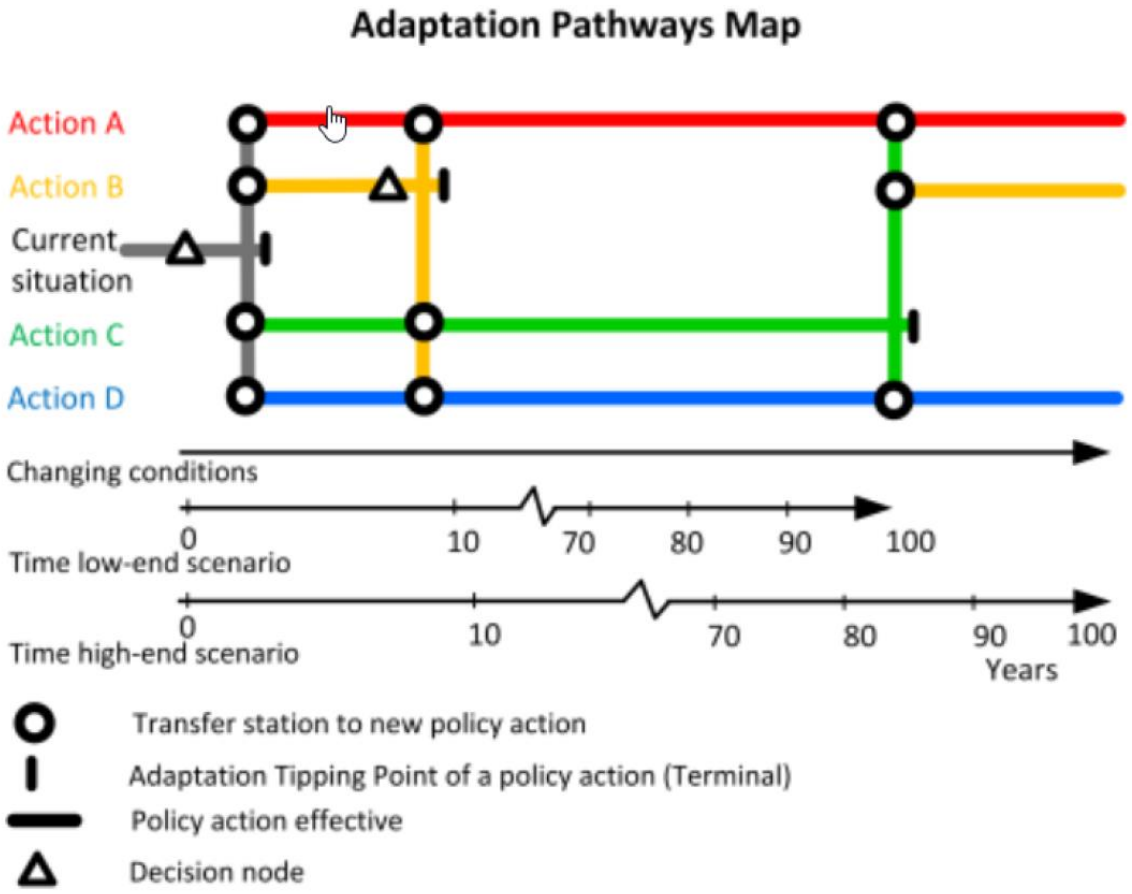
To plan actions, implementation and finance.

3. Strategy building

To develop strategies following an adaptive management approach, expressed in the predefined criteria.

Resilient urban water systems for citizens and communities

Dynamic Adaptive Policy Pathways



Costs and benefits of pathways

Time horizon 20 years

Time horizon 50 years

Time horizon 100 years

Pathway	Costs	Benefits	Co-benefits
1	+++	+	0
2	+++++	0	0
3	+++	0	0
4	+++	0	0
5	0	0	-
6	++++	0	-
7	+++	0	-
8	+	+	- - -
9	++	+	- - -

Pathways that are not necessary in low-end scenario

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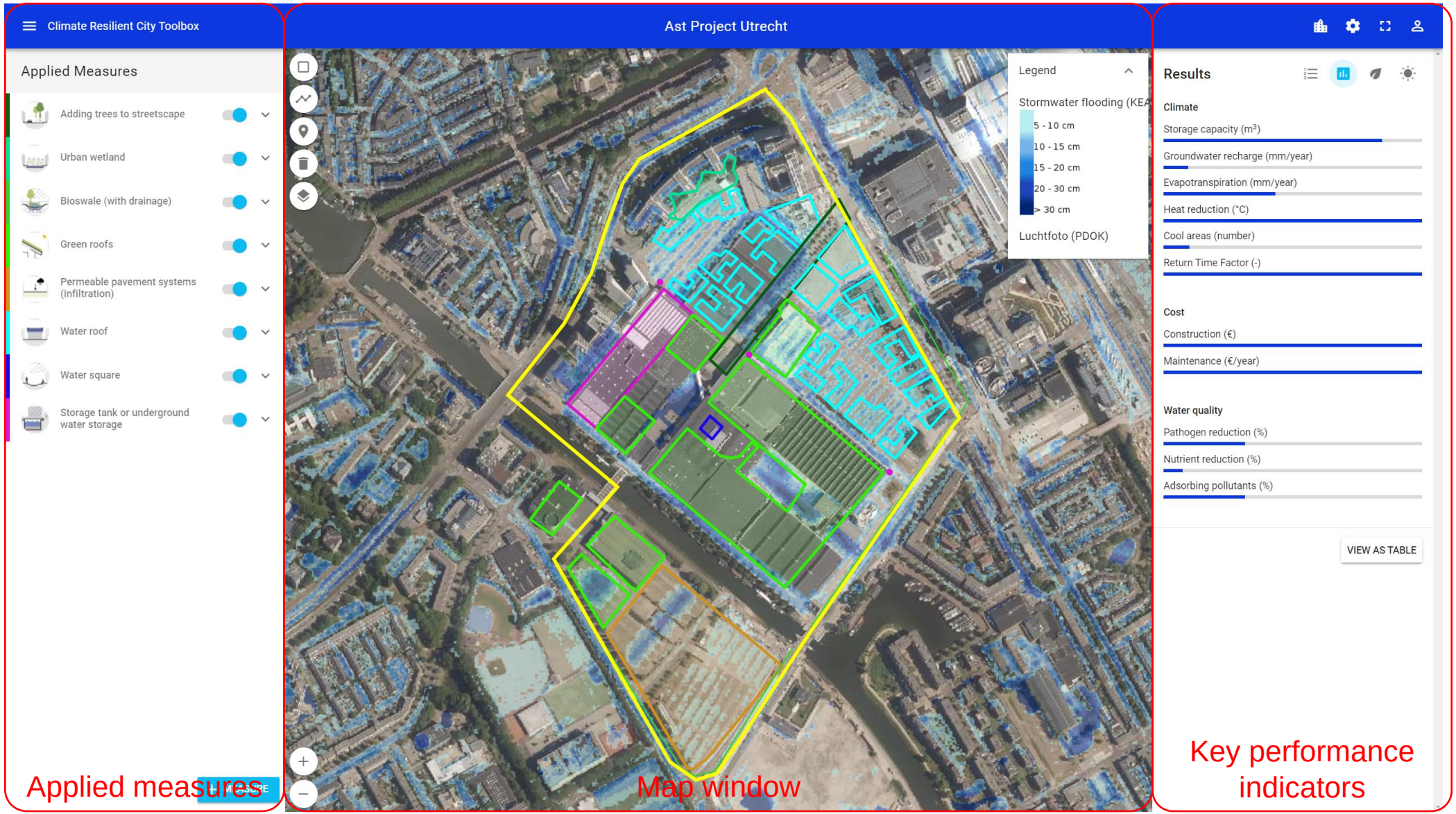
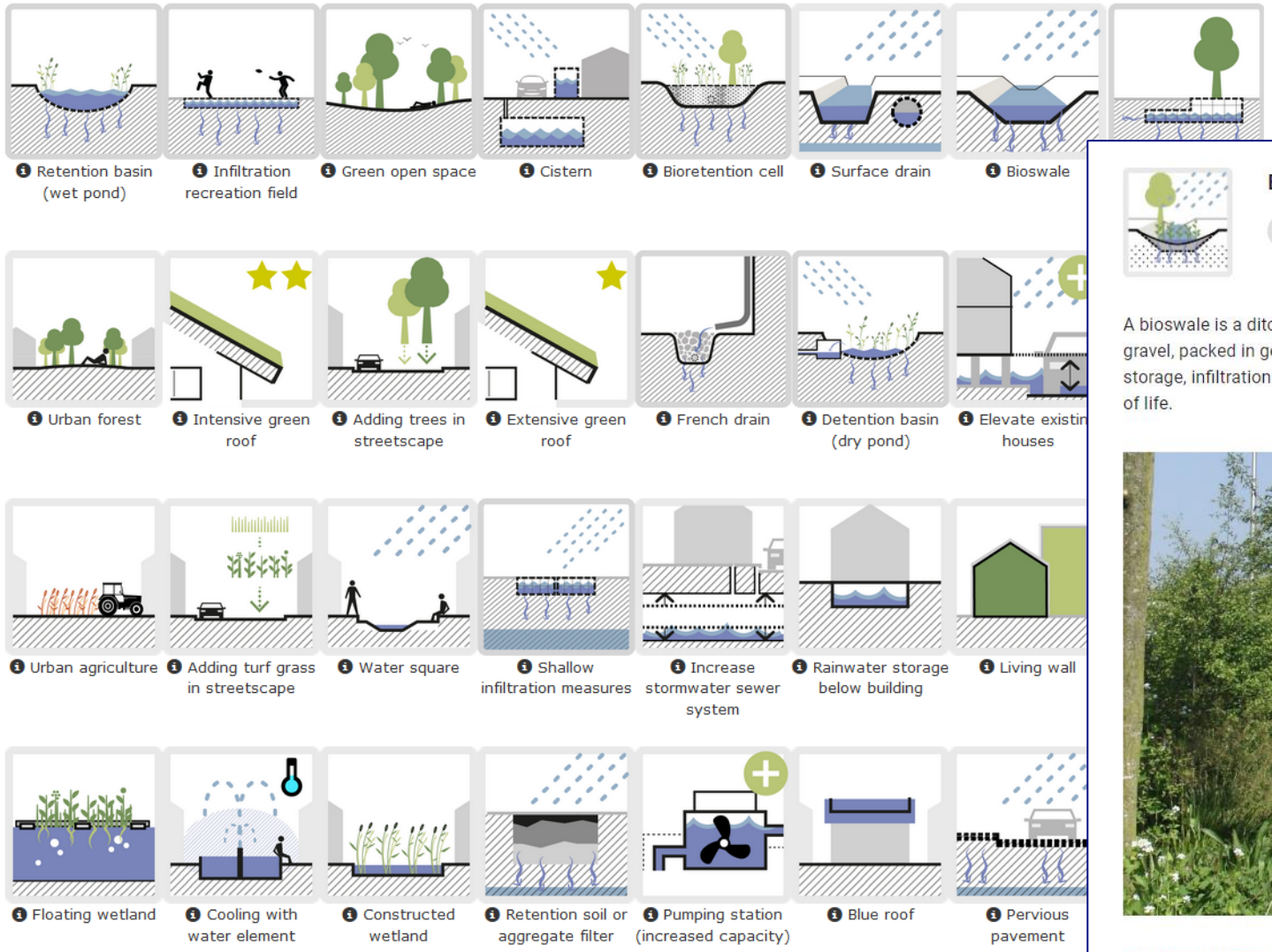
Climate Resilient Cities Toolbox (CRCTool)



CRCTool and database of GreenBlue Grids



Bioswale (with drainage)

Pluvial flooding | Drought | Heatstress

A bioswale is a ditch with vegetation, a porous bottom and below that a layer of gravel, packed in geotextile with an infiltration pipe/drainpipe. It allows rainwater storage, infiltration and transport while helping to enhance biodiversity and quality of life.

For more information click here

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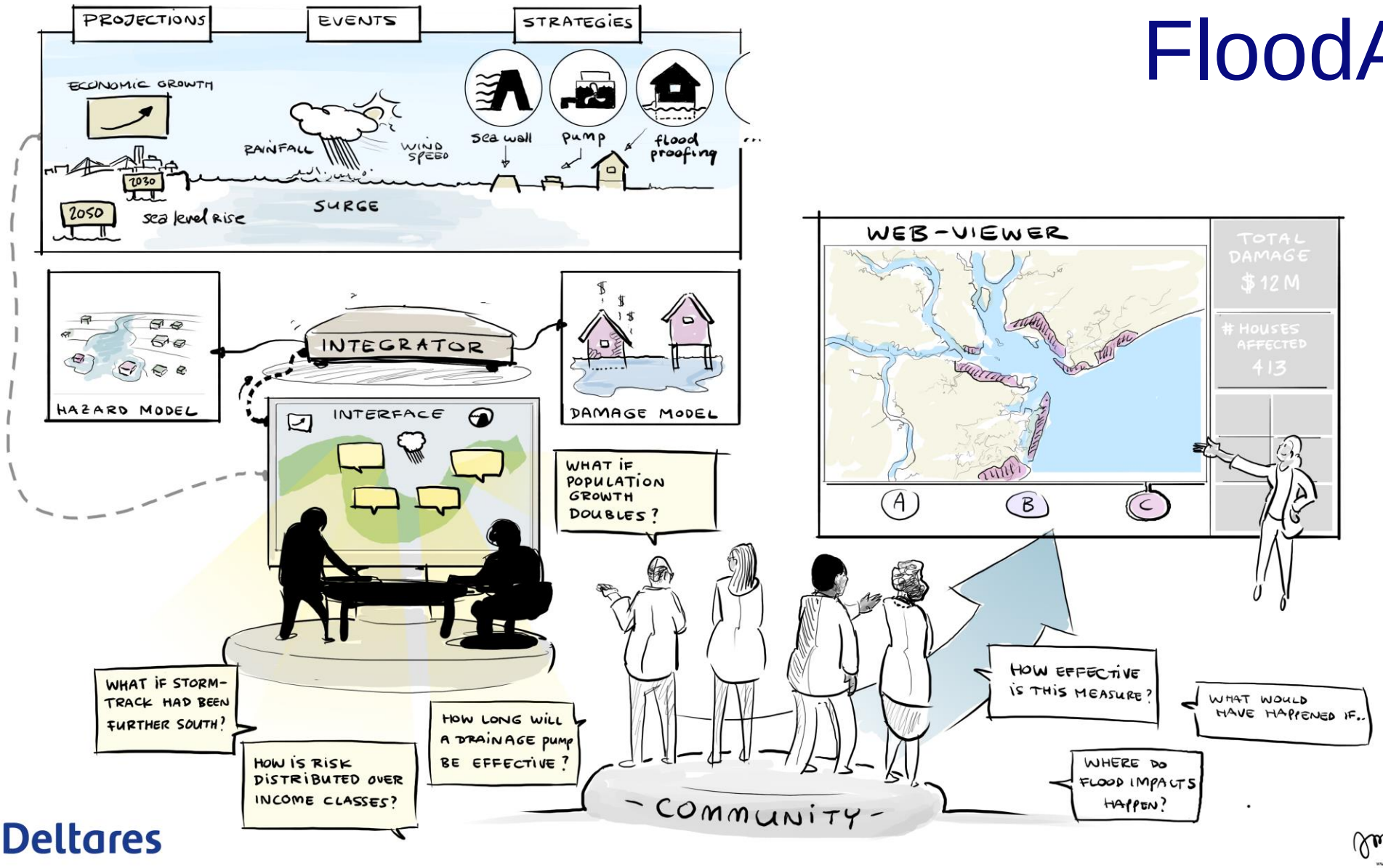
COMMUNITY FLOOD RESILIENCE SUPPORT SYSTEM



FloodAdapt

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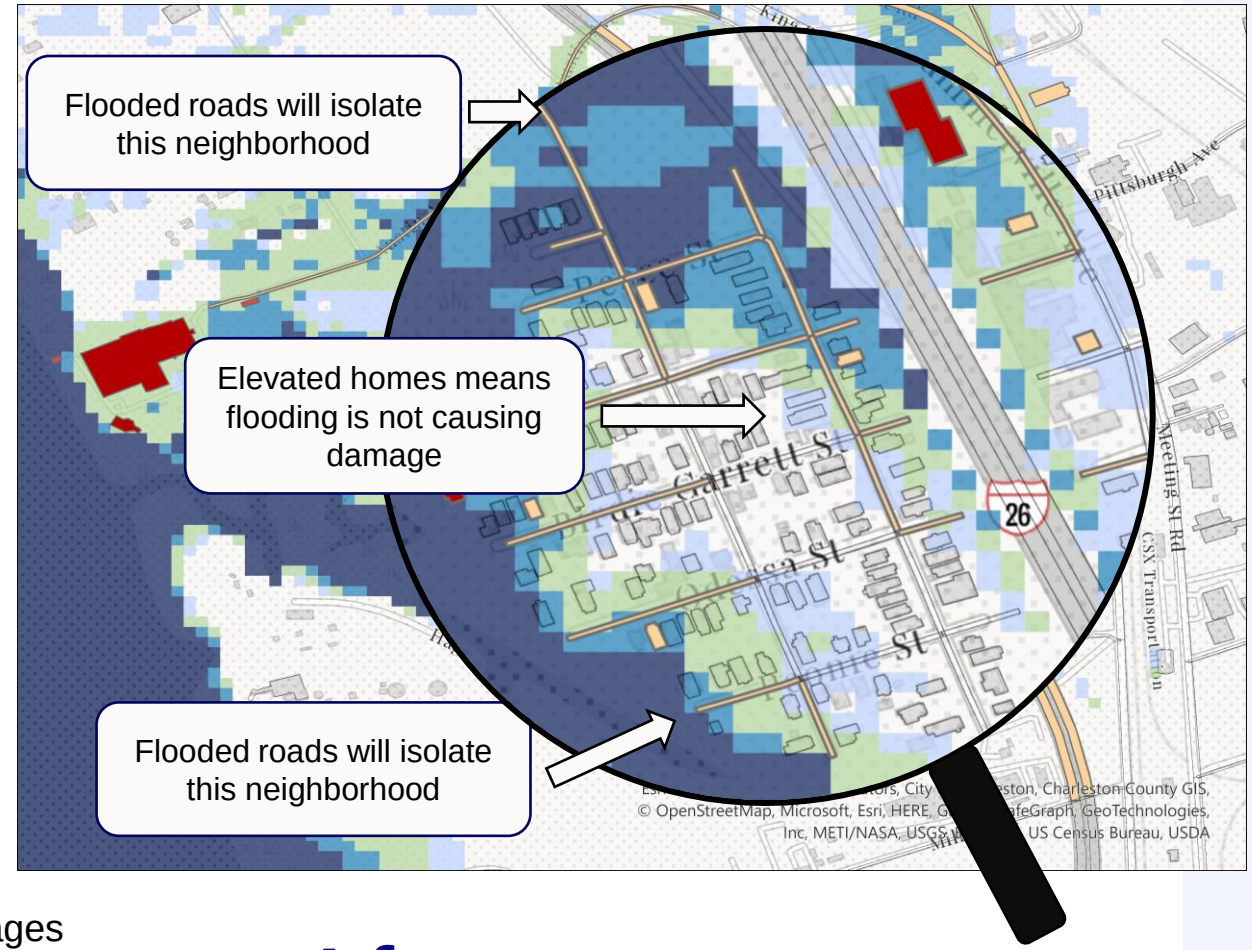
Resilient urban water systems for citizens and communities



Water depth
- 0 - 1 ft.
- 1 - 3 ft.
- 3 - 5 ft.
- > 5 ft.

Before measure

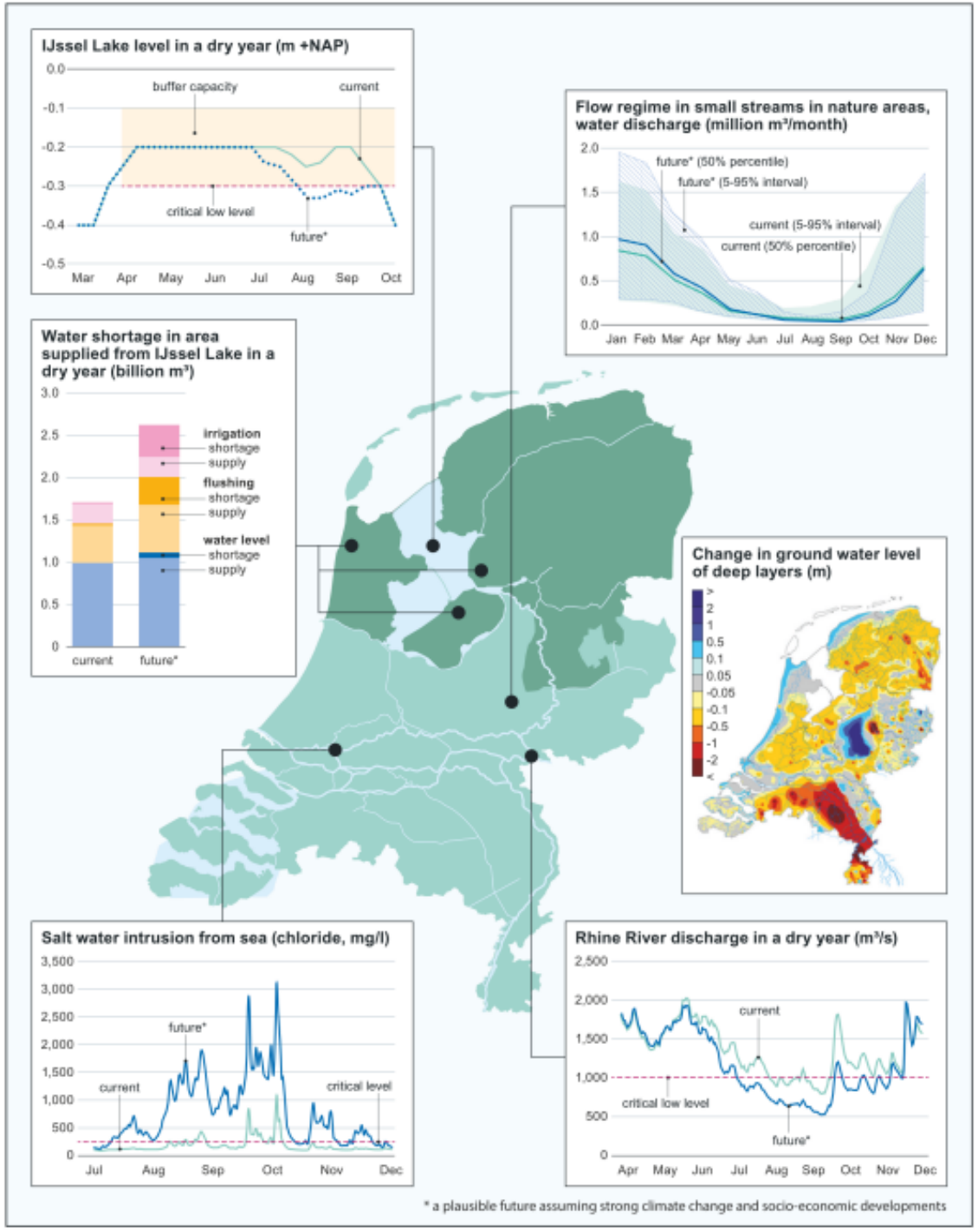
Damages
- No damage
- <$20K
- $20K - $60K
- $60K - $150K
- $150K - $400K
- >$400K

After measure

12-FOOT WATER LEVEL (+NAVD88)

National Water Model
for water supply and distribution

- Groundwater system
- Subsurface processes (soil moisture)
- Surface water (rivers, canals, water distribution)
- Human influence (irrigation, extractions, water management)
- Hydrodynamic simulation including salt concentration and temperature



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Conclusion

- Yes, we have to act
- Serious challenges and an increasingly changing climate ahead
- Good practices and approaches, methods and tools available
- And equally (if not more) important:
  - Data, modelling and monitoring
  - Governance and political will
  - Funds and funding mechanisms
  - Capacity and education
  - …
- To accelerate project implementation

Questions?

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