Shaping the future of urbanising deltas by design

ASSET Meet & Learn webinars
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Driving change

“Grand Design”

- Top down
- Looking far ahead
- Catchment/national scale
- **Imagination & evidence**

Locally led adaptation

- Bottom-up
- Near future
- Local (neighborhood) scale
- **Demonstration**

Cities: challenges & shifting paradigms

Current emphasis still too much on short-term solutions

Urbanization, transition in energy & food production will likely be dominant drivers shaping the future of our cities

Integrated vision on the future (and long-term strategy) is often lacking

Rotterdam: Transition to a Water Sensitive City
Small steps, opportunistic, linking short actions to long-term aspirations (vision)

PAST

PRESENT

FUTURE

Paradigms are shifting (1)

Broadly shared assumptions (before 2010):

1. Climate change is slow, and might accelerate after 2050
2. We know how the water-system works; we can predict how it will react on different pressures in the future, so we can plan ahead and will gradually strengthen the present system.
3. By anticipating long term future-conditions we will prevent disastrous events

Paradigms are shifting (2)

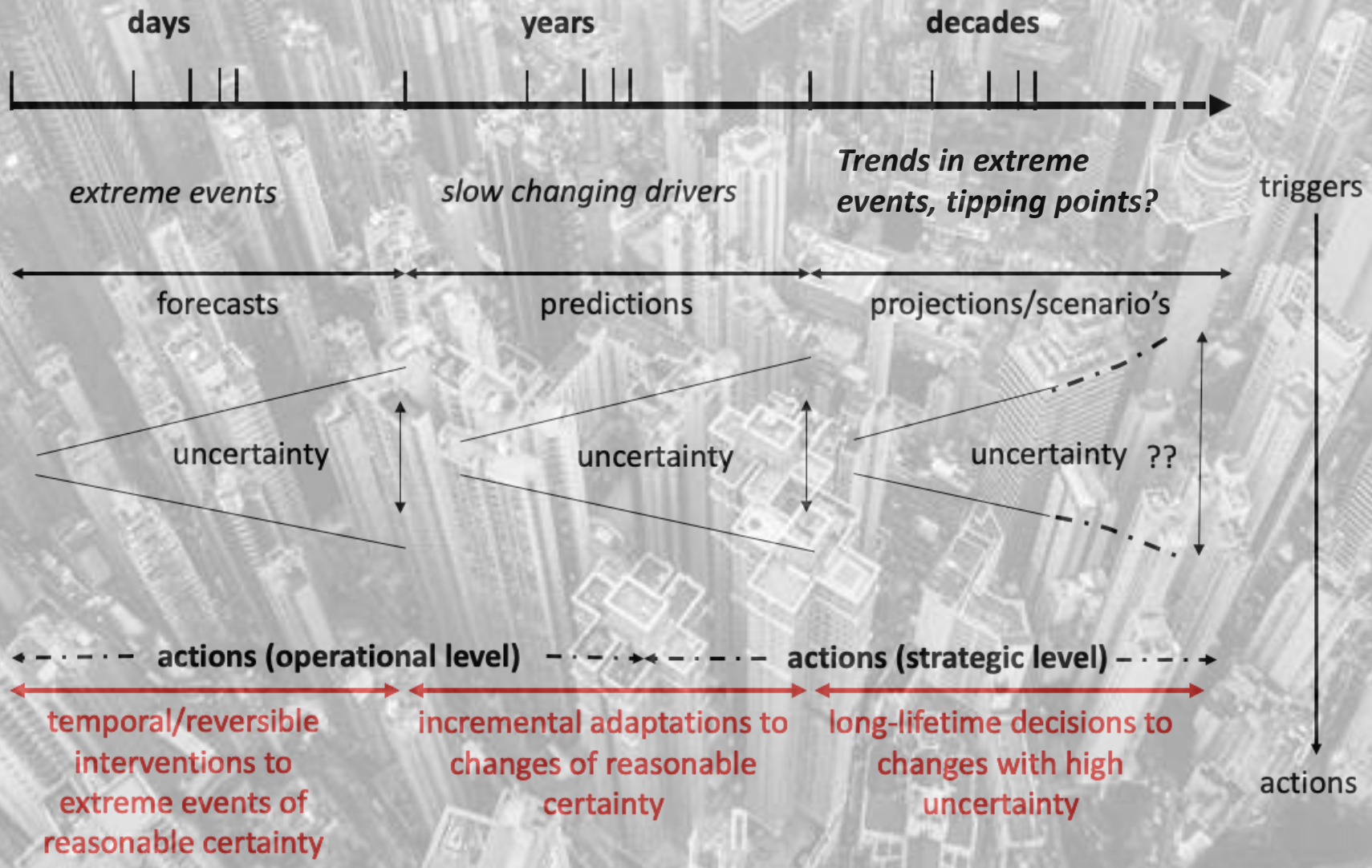
But now, present day, these assumptions **are changing**:

1. Climate change is happening now; and is not gradual
2. The water-system that we thought we knew so well reacts in a way we did not expect
3. Incrementally adjusting our water infrastructure will likely not be enough
4. Cities have to look beyond borders to cope with extreme weather events (systems approach)

The current emphasis on short-term solutions for the world's deltas will greatly constrain options for designing sustainable solutions in the long term.

(source: Tessler et al., Science 2015)

Connecting time scales



CLIMATE TIPPING POINTS

TIPPING POINTS
CONNECTIVITY

1
Amazon rainforest
Frequent droughts

2
Arctic sea ice
Massive losses

3
Atlantic circulation
A slowdown since 1950s

4
Boreal forest
Increase in fires

5
Coral reef
Mass die-offs

6
Greenland ice sheet
Ice loss accelerating

7
Permafrost
Melting

8
West Antarctic ice sheet
Ice loss accelerating

9
Wilkes Basin
East Antarctica ice loss accelerating

COP26

- Need to act now
- Resistance to change
- Appealing future ?

We need to find ways to tip transformative change in social-ecological systems in a desirable direction *(Lenton, 2020)*

Positive tipping point: ‘restorative redirection’

The Netherlands


Are we in control?
Boote queren

Are we in control?

Source: Geert vd Meulen (TuDelft)

Lead time vs warning time of interventions

Prepare

Large scale interventions

Small scale interventions

Agile

Warning time systems

Lead time interventions

Inspired by Pieter Bloemen (2020)

Deltawerken (1953-1997)

Deltawerken (1953-1997)

Regime	Predict & control
focus	Stability, performance individual (infrastructural) system/elements
problem perception	Changes in system/drivers are predictable and can be controlled
principle strategy	Robustness, static norms and standards, fail-safe, probabilistic approaches
governance	Top down, dominance of engineers

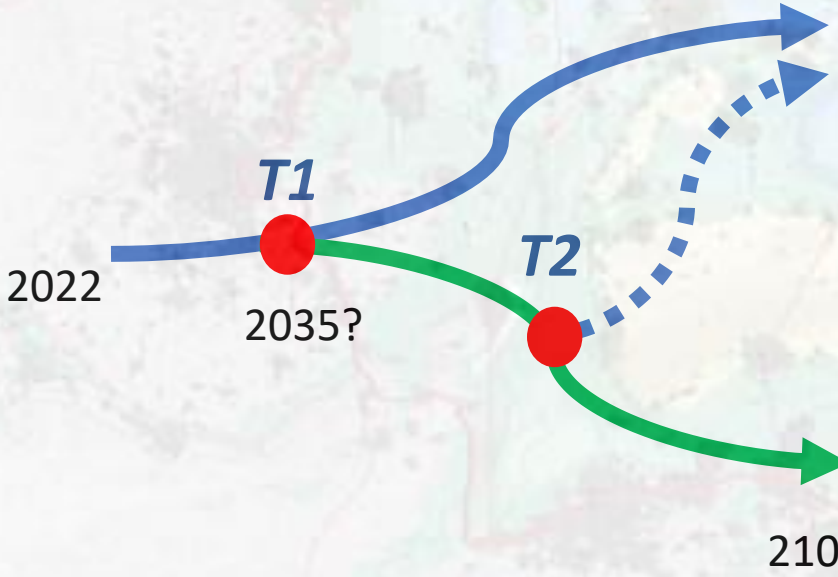
Delta Program: 2006 -2015

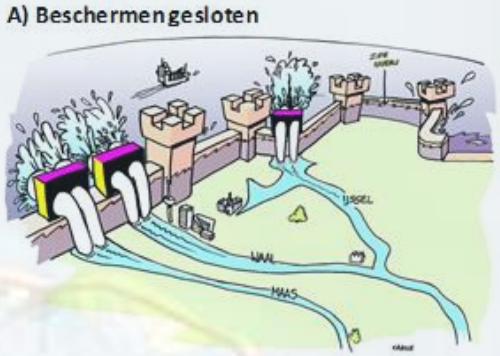
Room for the River: project Noordwaard (polder detention reservoir)

Delta Program: 2006 -2015

Regime		Adaptive & integrative
focus		Persistence, overall infrastructural systems performance, adaptive capacity
problem perception		Changes in system/drivers are uncertain, slow changing drivers, anticipation (there is enough time),
principle strategy		Adaptive planning, strategic alternatives (pathways), Incrementally adjust (adapt)
governance		Multi-level, informed decision making/science

The Netherlands 2025: bifurcation?





"Protect by Embankment Rehabilitation"

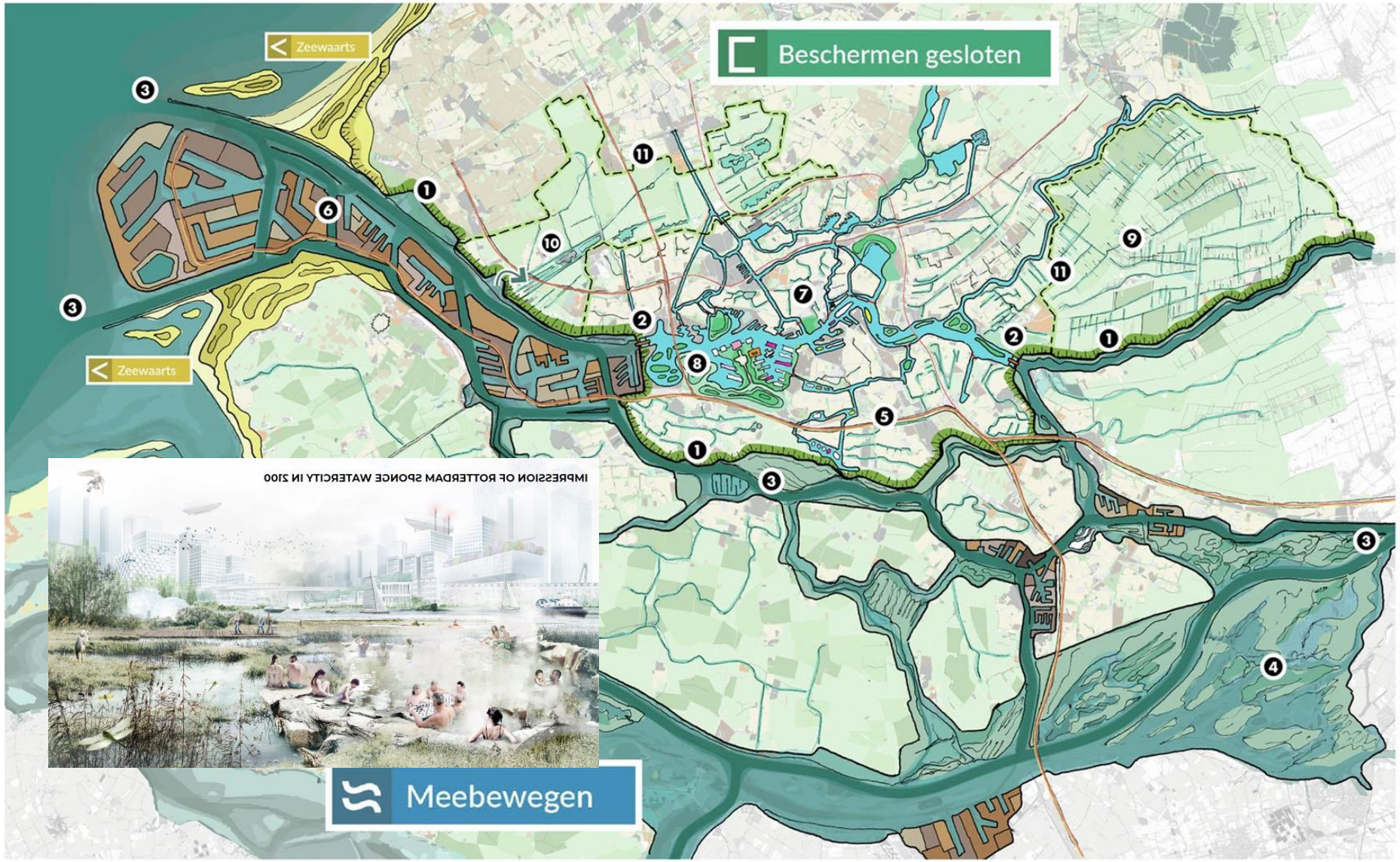
"Living with Water"

Johan van Veen (1893-1959) created a vision for a sustainable and safe & secure future for The Netherlands

TWEESTROMENLAND – LEVE(N)DE DELTASTAD, 2023.

(TWO-STREAM TERRITORY – LIVING DELTA CITY, 2023)

Spatial design of a section of the Dutch delta in 2100

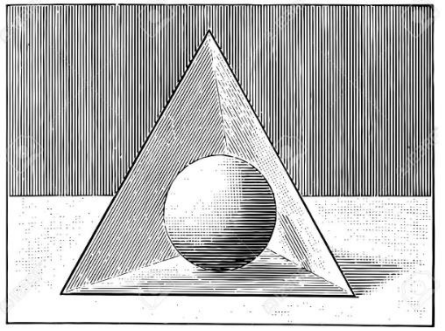


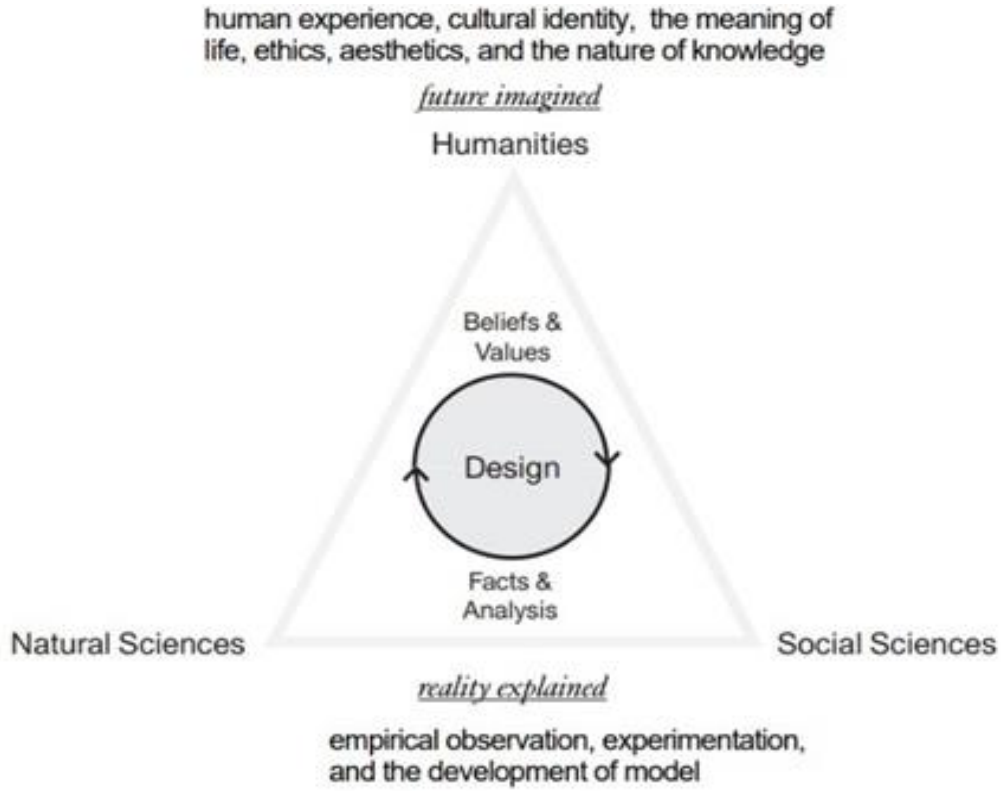
1. The delta dike (flexibility to grow in the future)
2. New sluices
3. Main waterway
4. Tidal estuary
5. Multimodal transportcorridor
6. Organic cellular harbour (incremental transformation)
7. Watercity - Watermachine supports city as a sponge
8. River as central park
9. Peat marchlands
10. Controllable overflow to climate buffer
11. Compartment dikes

The Netherlands, 2020 -> 2100

Regime	Restorative redirection
focus	Desired future, imagination, values matter
problem perception	Changes in system/drivers are uncertain, values in dispute, stakes high and decisions urgent
principle strategy	Planned adaptation, foster positive tipping points, transformation, *nature-based*
governance	Multi-level, strong influence of politics, peer community involvement

Uniting imagination & evidence by design





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Uniting imagination and evidence b navigate climate survival in urbanizing deltas

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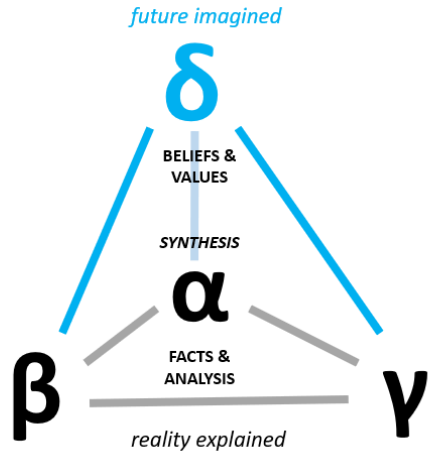

Concluding remarks:

- Design is driving change!
  - Synthesis (imagination and evidence)
  - Hypothesis
  - Analysis (and testing).
- Design principles:
    - from efficiency to maximizing value
    - design for failure & extreme scenarios
  - Connecting temporal and spatial scales/systems approach
  - a portfolio of measures (reconciling short term measures with long-term vision)
  - long –term horizon: to seize/create opportunities (positive tipping points)