The Three Points Approach

Climate change in Europe

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Auckland, 16th May 2007

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Presentation

- Context (theoretical background)
- The Netherlands
- Pictures from Europe (Germany, Scotland, Austria, Czech Republic, etc.)
- Linear versus non-linear
- The bifurcation: reactive or pro-active
- Two observations (both technical and societal)
- Self-organised criticality
- The Three Points Approach
- Rotterdam Water City 2035
- Conclusions

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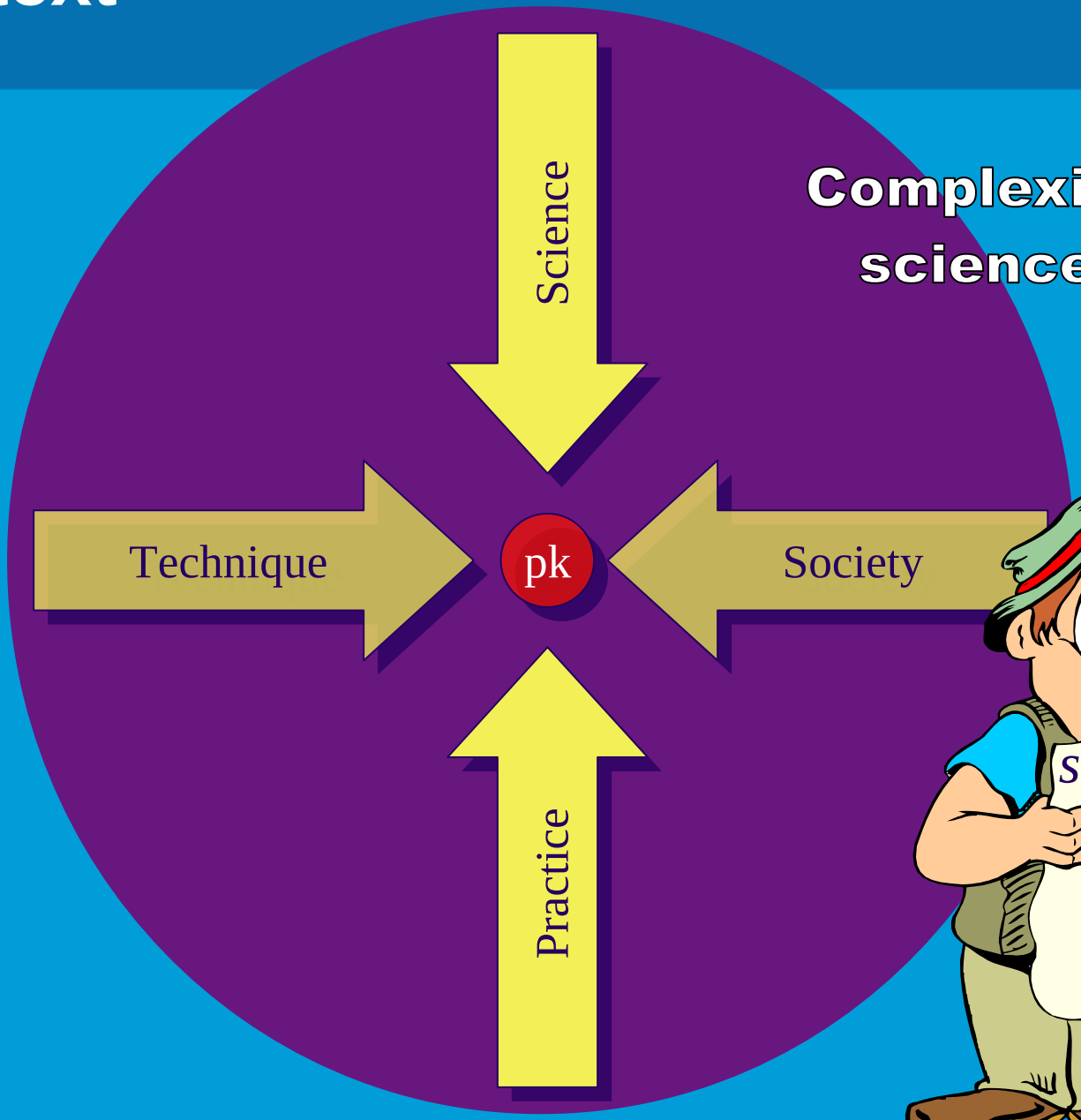
Context



Complexity science

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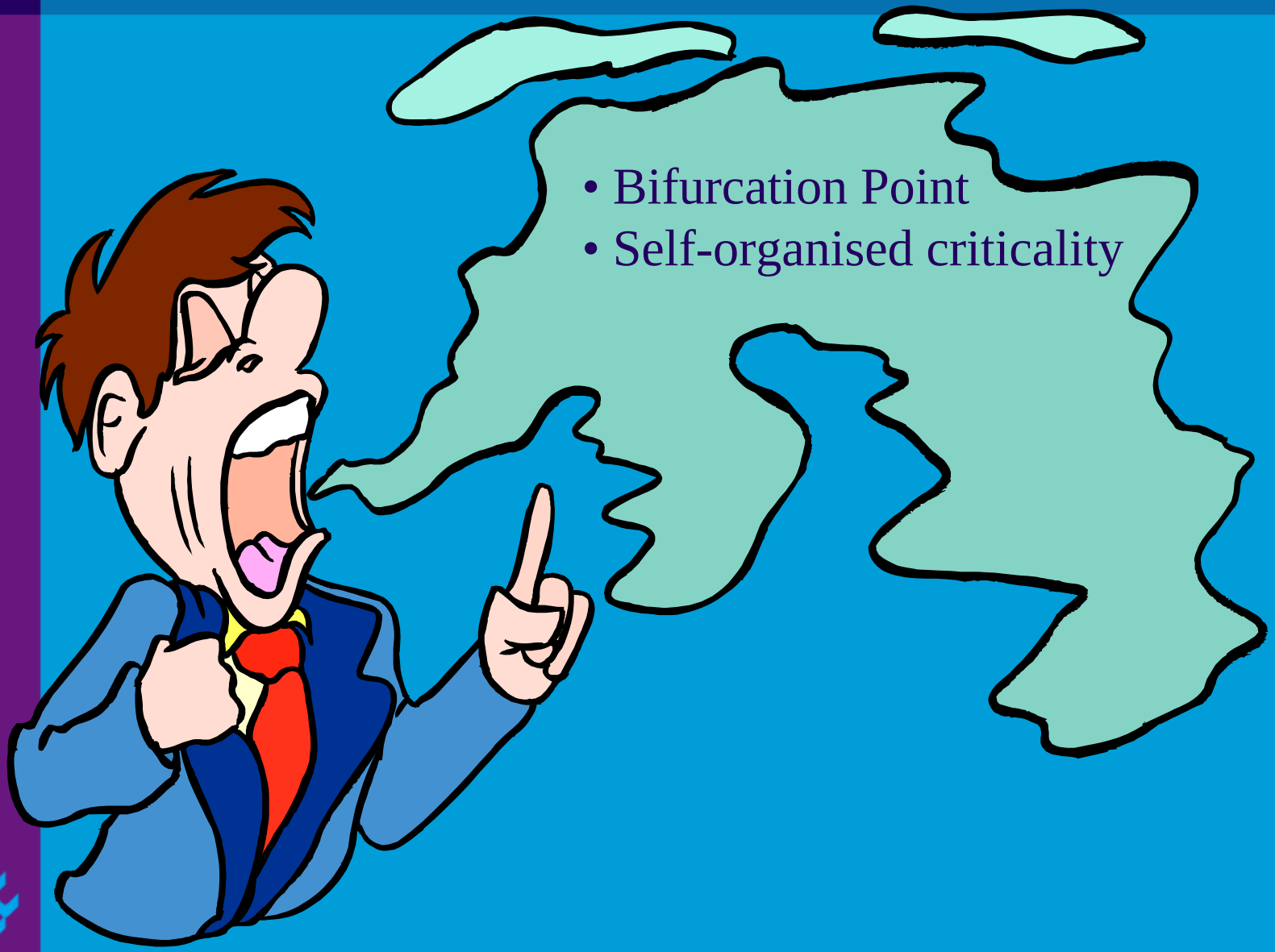
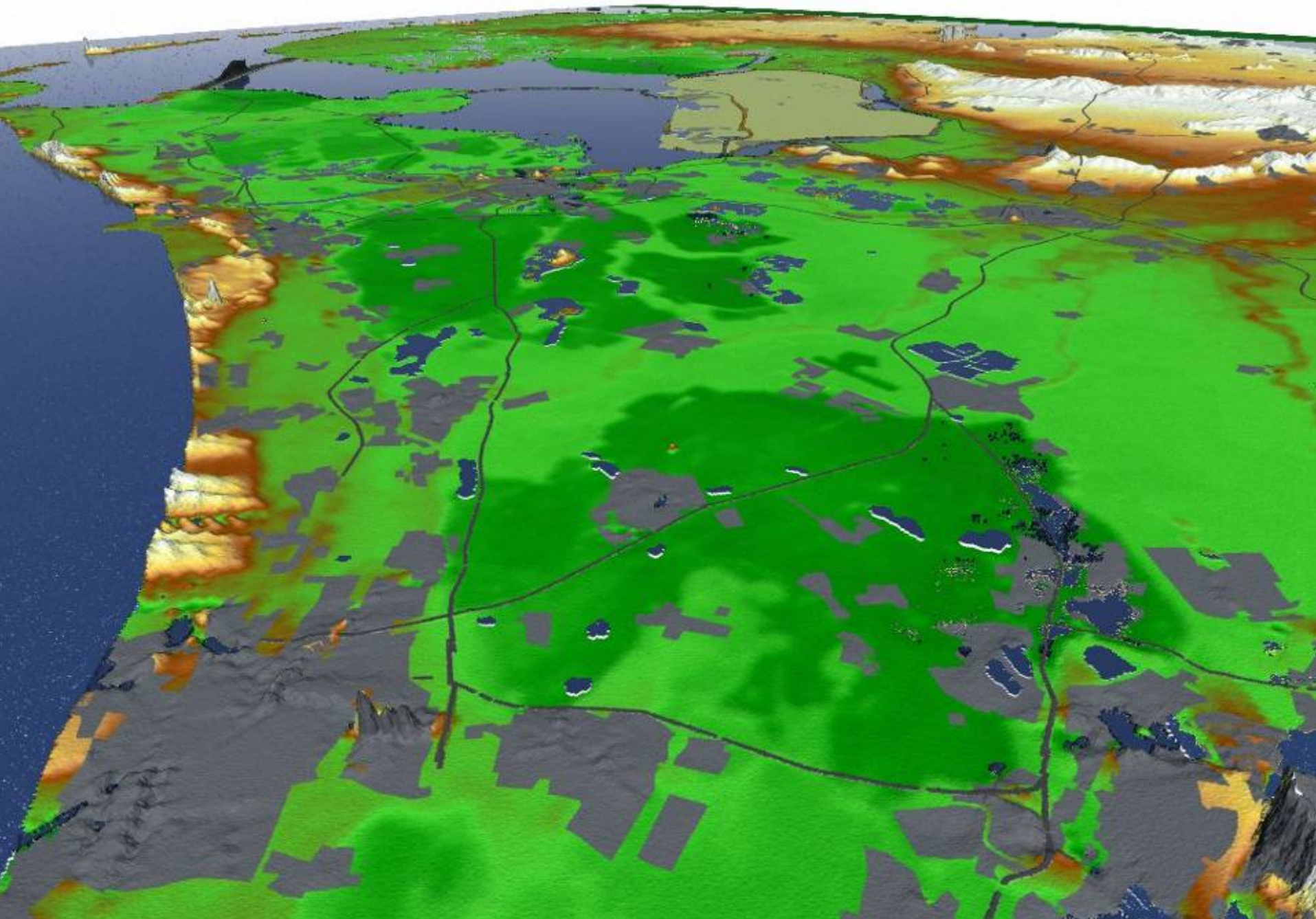
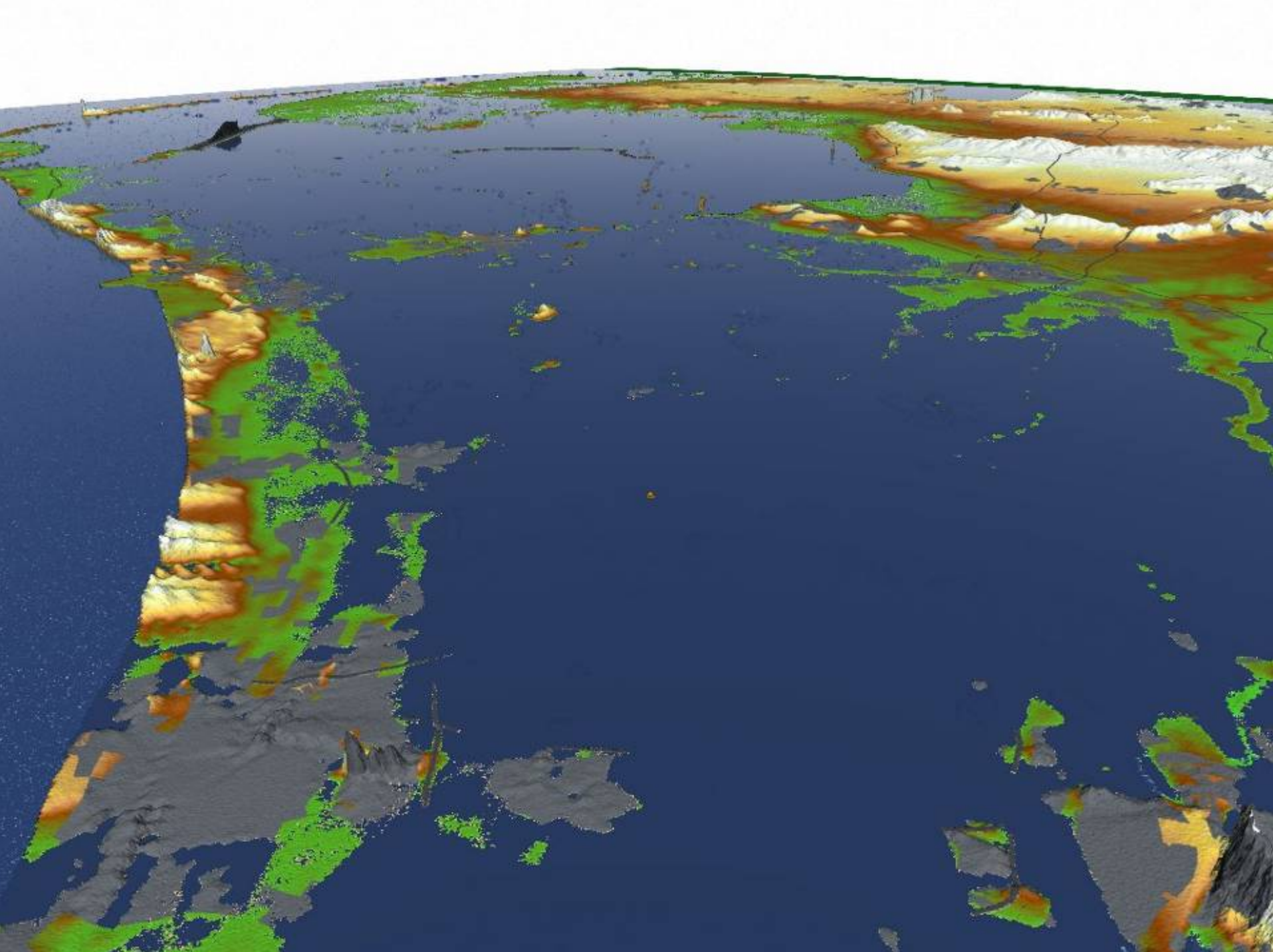
Two concepts from complexity science



The Netherlands

Ondergrond Nederland
Water
zoutwater
zoutwaterzandlenzen
beschijnen zeeën
primaire kwetsbaarheid
Kelig
hoogtelijning
diepteliijning





Netherlands, 1953

SCOTTISH
WATER
30 July 2002
1500 hours

SCOTTISH
WATER
30 July 2002
1715 hours

Austria, North of Vienna

Verdronken zonnebloemen

Een ondergelopen veld zonnebloemen nabij Gedersdorf, tachtig kilometer ten noorden van Wenen. Zware overstromingen hebben in Oostenrijk grote schade aangericht.

FOTO REUTERS

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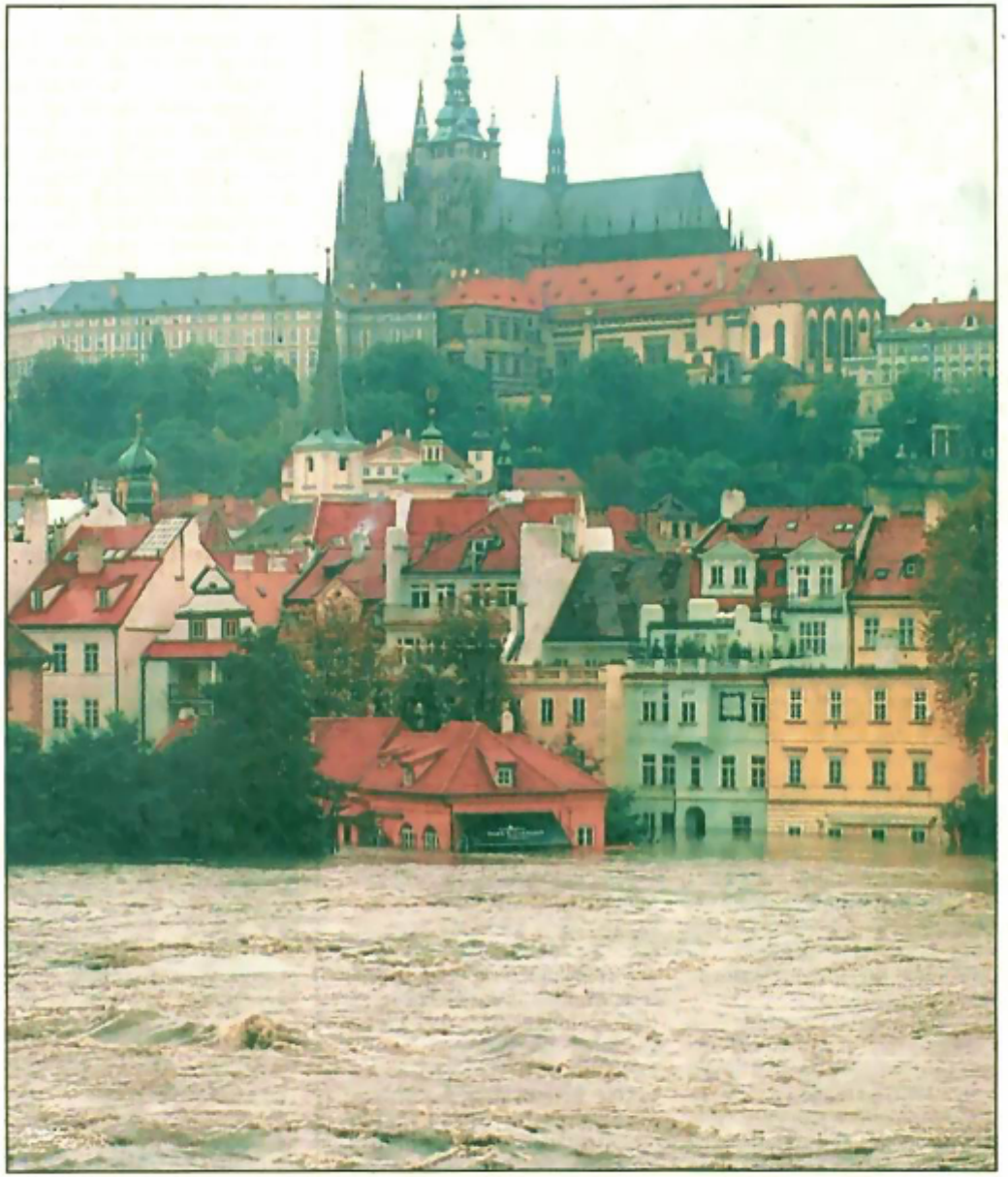
Prague



In het oude stadsdeel van Praag staan tientallen eeuwenoude huizen tot aan de tweede verdieping in het water. Gisteravond joeg de Moldau ruim 4770 kubieke meter water per seconde door de Tsjechische hoofdstad, ruim dertig maal de normale hoeveelheid. Of de beroemde Karelsbrug het dit keer houdt, is de vraag. Al sinds maandagavond is de voetgangersbrug met zijn fraaie beelden voor iedereen gesloten. (Foto AP)

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Het Zwingerpaleis (midden) en de Semper-Opera (links) in het oude centrum van Dresden zijn omringd door water uit de Elbe.

FOTO AP

Dresden: four waves

- Urban flood
- Side rivers flood
- River Elbe flood
- Groundwater wave

Most people killed

Economic damage

Tauw

Dresden

Evacuatie

Reddingswerkers trekken twee boten met oudere Dresdenaren door de overstroomde straten van de stad. Vanwege de noodtoestand moest een deel van de bevolking worden geëvacueerd. (Foto Reuters)

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Egmond aan Zee
August 2006

Increasing droughts

Scheepstransport

NIJMEGEN - Een groot deel van de Nijmeegse Waalhaven staat sinds gisteren geen water meer waardoor veel schepen op het droge kwamen te liggen.
Door het uitblijven van regen is het waterpeil in veel vaarwagen tot een kritisch minimum gedaald, waardoor scheepstransporten stil zijn komen te liggen. Met name de waterstand in de Rijn en de Waal zijn extreem laag. Dit weekend wordt bij het peilpunt Lobith de laagst gemeten waterstand ooit verwacht. **(Foto ANP)**

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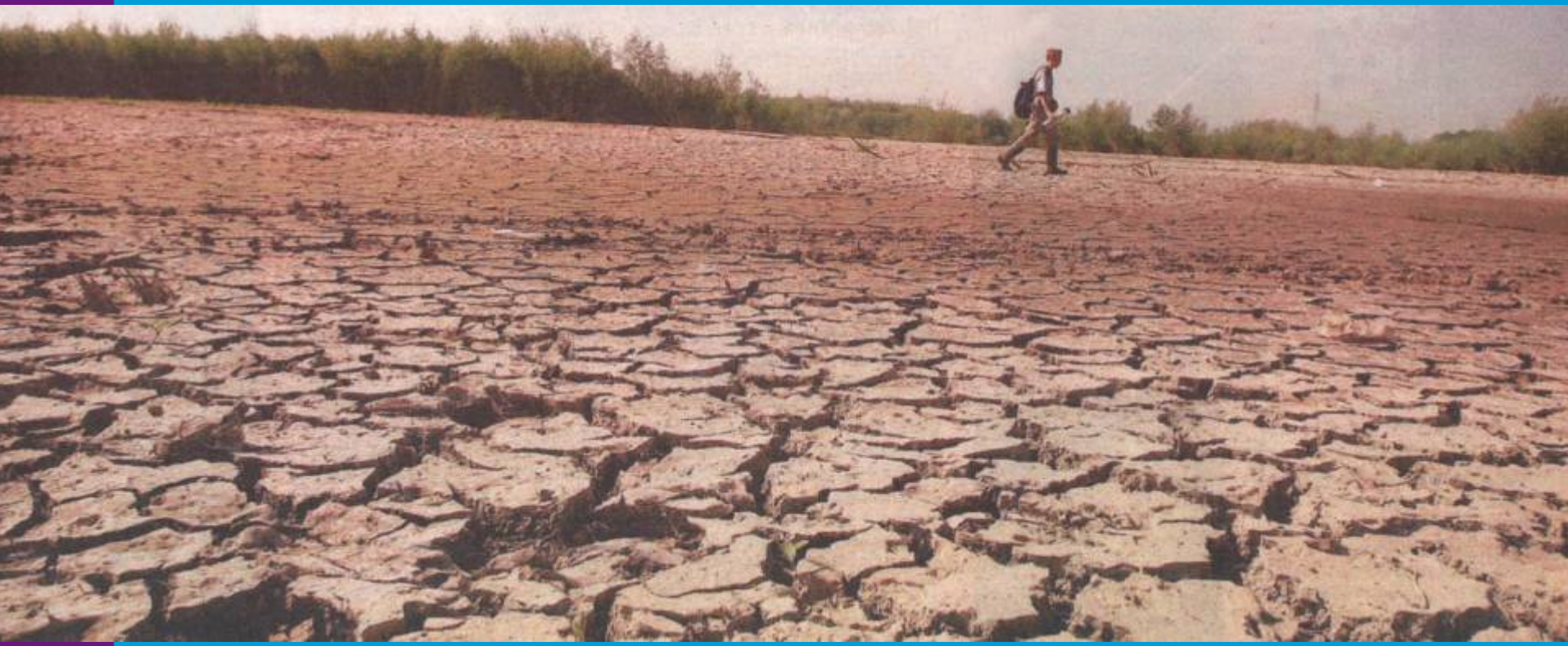
Netherlands, April 26th 2007



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Po River, Italy May 6th 2007

Practitioners have questions (three groups)

1. Is the sewer system working properly? Has it been maintained properly? Should we find new water sources? What are our responsibilities? Do we need insurance?
2. Can we organise the spatial planning and urban planning so that damage can be avoided or reduced?
3. How can we make a connection with other policy fields, like water quality (European Water Framework Directive), traffic, quality of housing and public space, social segregation, the values of water, etc. People have to be aware of the problem!

Technical questions

Spatial planning

Connections - Synergy

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Practice and science

- There is a mismatch between the questions practitioners ask and the answers scientists offer
- In European Framework programmes: many new models that practitioners have to use

Before we can say anything about urban flooding, we have to know the uncertainties in climate change …

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Models in the complex world

Models

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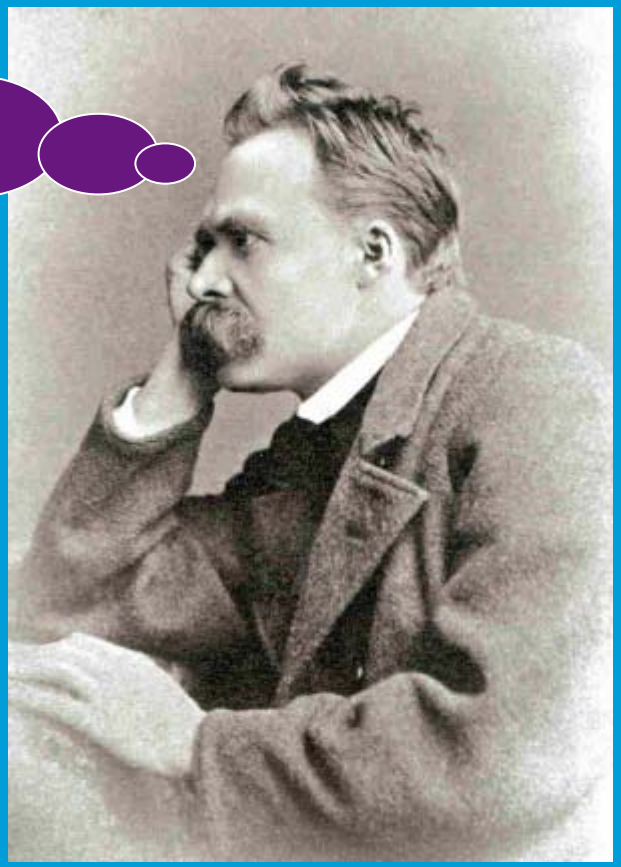
Friedrich Nietzsche

Two truths:

1. The world as it as, that is presenting itself as an ‘illogical’ and as a cruel phenomena
2. Our own ‘model’ (conviction – ‘a little lie’)



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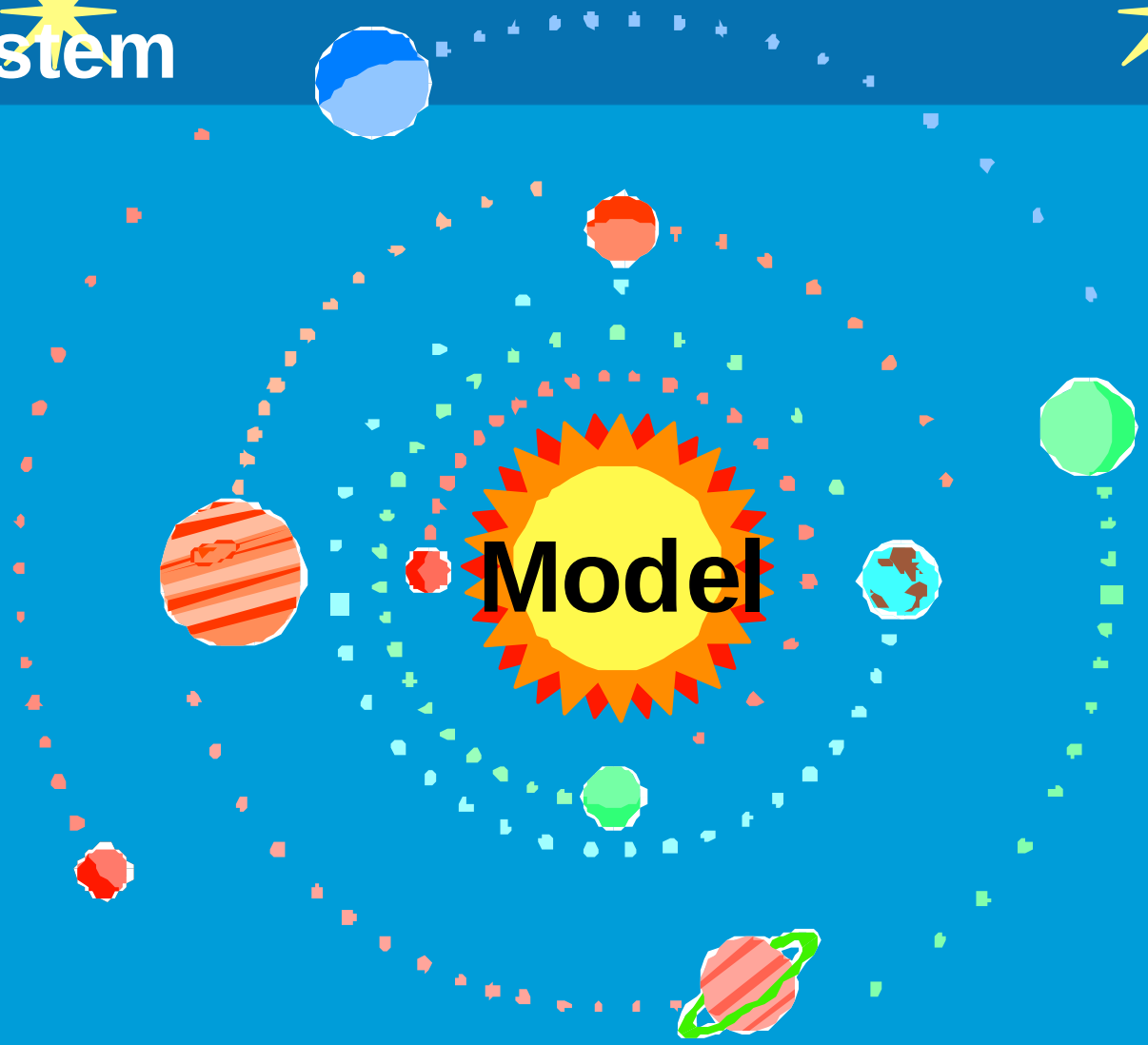
The ‘model’ as the centre of the solar system



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Mechanisms in science (caricature?)

- Dominating positivistic paradigm (especially in urban water management research)
- Utilitarian approach – easy value for money
- Self-referential communication and ivory towers
- Personal targets and quotations index
- Studying behind the computer – not in the field
- Underestimating value of tacit knowledge
- Integration is complicated
- As a result: fragmented and linear research

Tauw

Mechanisms practitioners (caricature?)

- Everything is related to everything (make it simple)
- Integration is self-evident (when you make something)
- Thousands of new reports and papers – no time to read
- Political power games and: fear, group protection, bureaucracy, opportunity seeking, financial problems, irresponsibility, etc.
- Lack of trust and public support
- Separation of policy, planning, design, implementation, maintenance
- As a result: fragmentation

In this world we have to adapt to climate change. It is complex. So it can make sense to use insights from complexity science – the science of non-linear system – to see if it brings us one step further

Two approaches, two policies

1. Optimising the existing system in a technical way (people are not interested); linear approach; many new – and better – models; reactive strategy
2. System jump (transition); adaptation technical and societal system; non-linear approach; pro-active

Second approach is needed, first approach represents policy in most of the European countries

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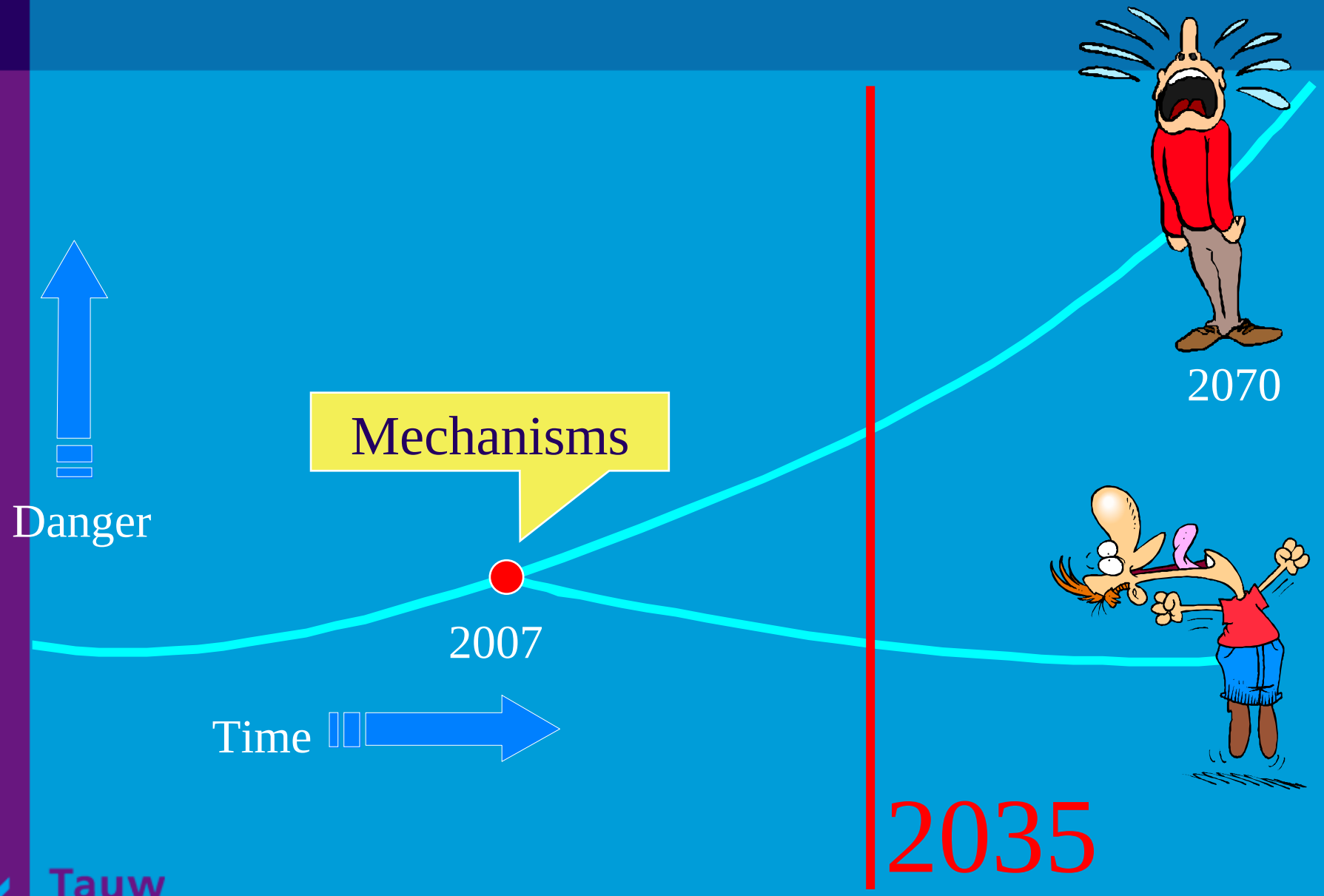
Bifurcation point



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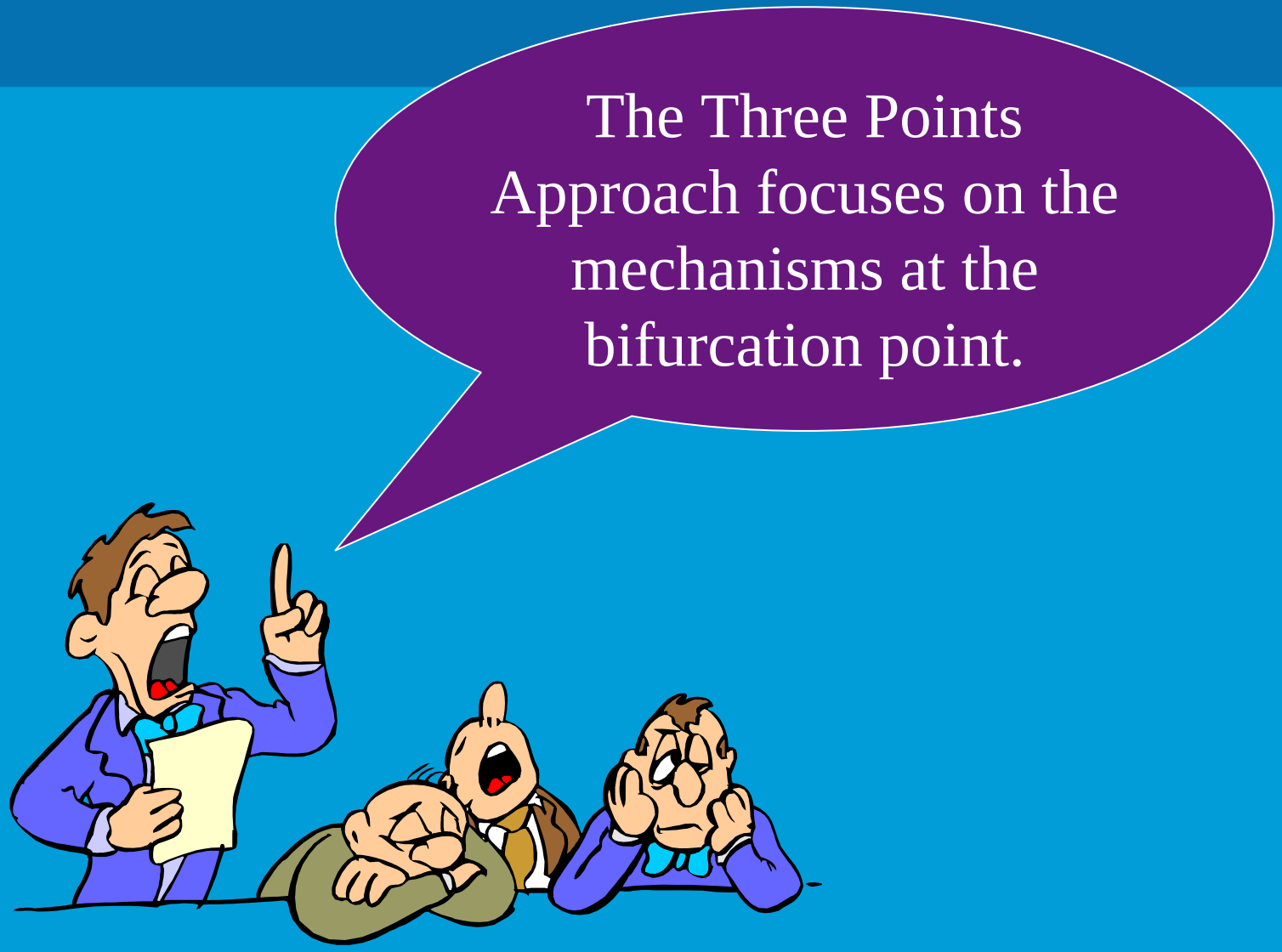
Arnhem
Nijmegen
Bifurcation point
ROZEN-DAAL
RHEDEN
STEENDEREN
DOESBURG
RENKUM
WAGENINGEN
ANGERLO
WESTERVOORT
DUIVEN
DIDAM
OVERBETUWE
ZEVENAAR
NEDER-BETUWE
LINGEWAARD
DRUTEN
BEUNINGEN
UBBERGEN
WIJCHEN
GROESBEEK
HEUMEN


The Three Points Approach focuses on the mechanisms at the bifurcation point.

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Observation 1: Safety is nonlinear

- Risk = f (hazard, vulnerability, …)
- Safety = f (risk, risk perception, …)

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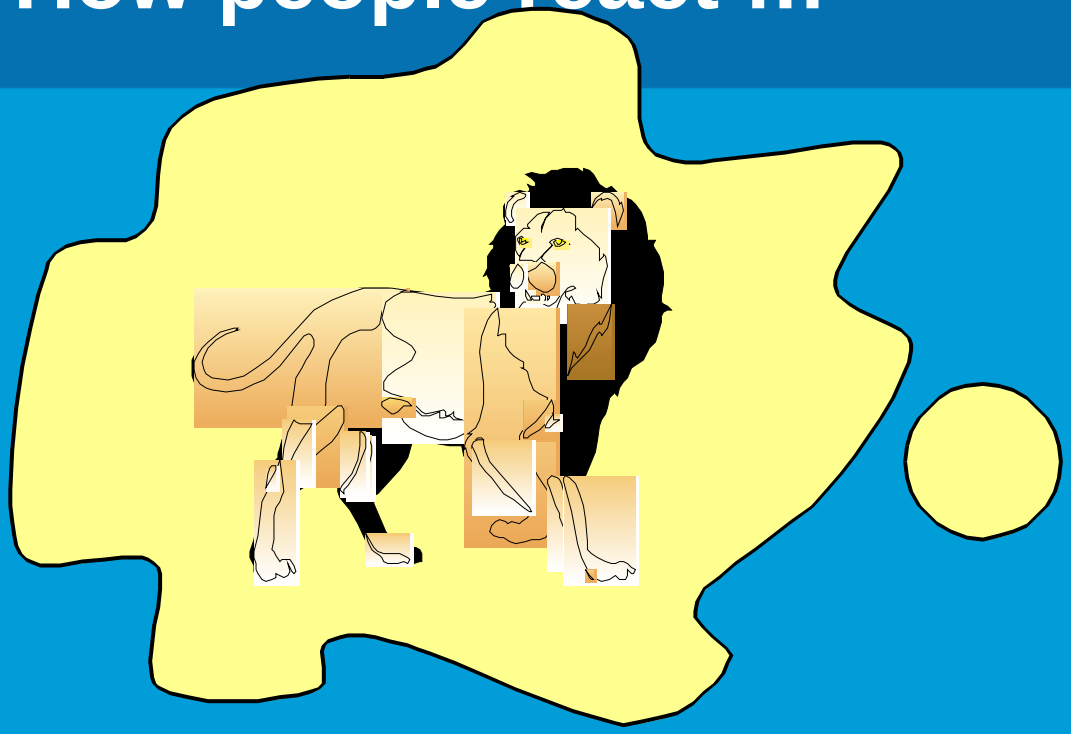
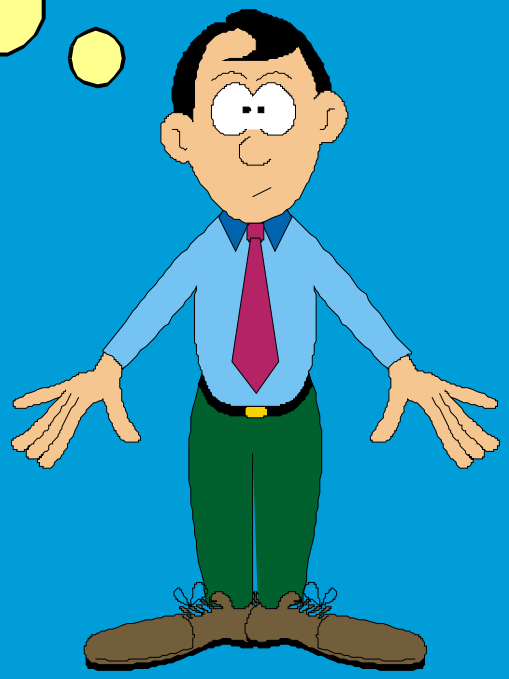
How people react …



Real Risk

Perceived Risk



or the other way around …

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Perceived risk, influenced by:

- Magnitude of the risk
- Time
- Culture
- Possibilities to reduce effects by behaviour
- Choice (are people voluntarily living there?)
- Advantages of living in that area
- Attention given to it by the media
- Way of communication
- Trust in the local government …

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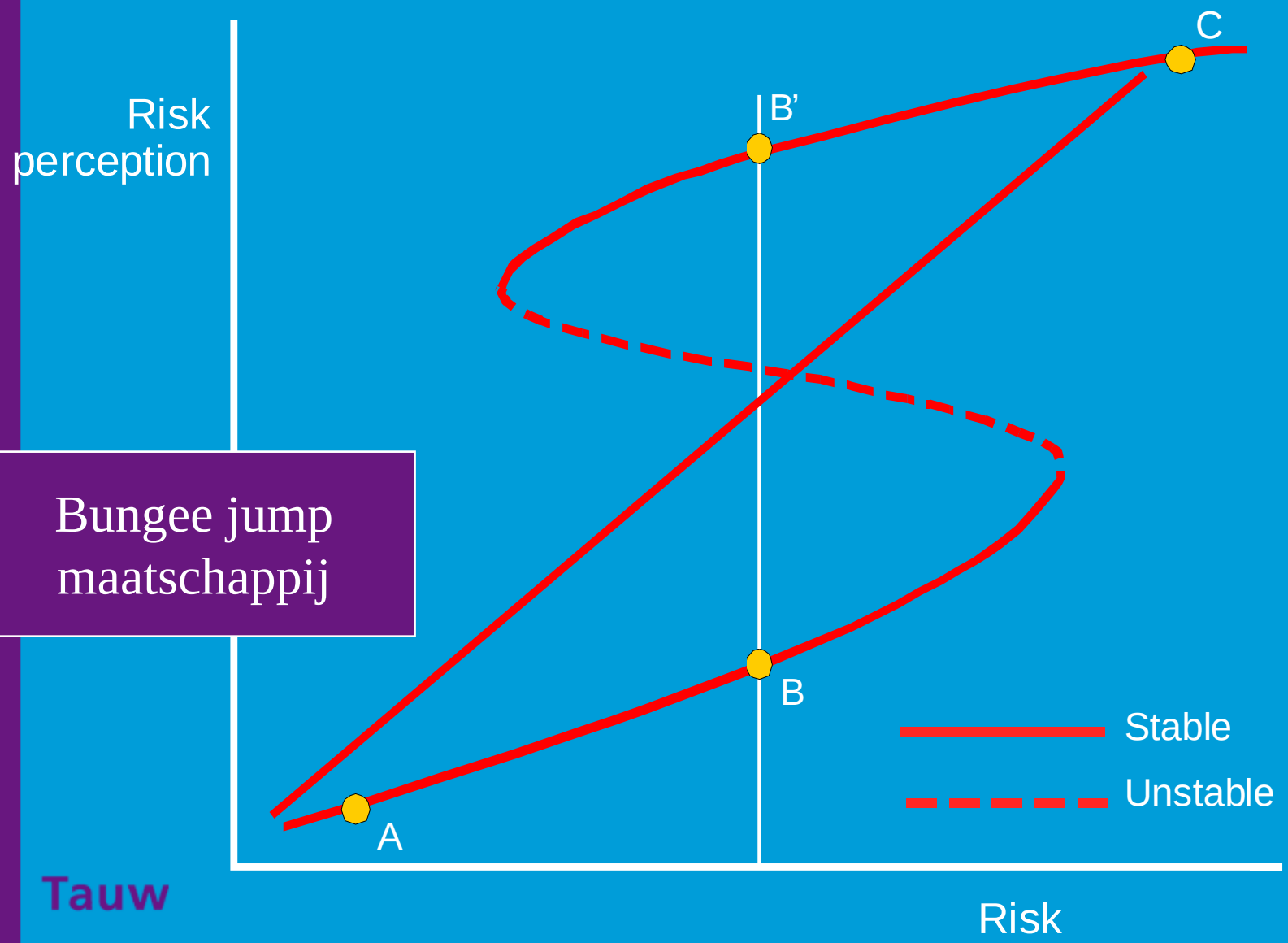
Non-linear relationship



Bungee jump maatschappij

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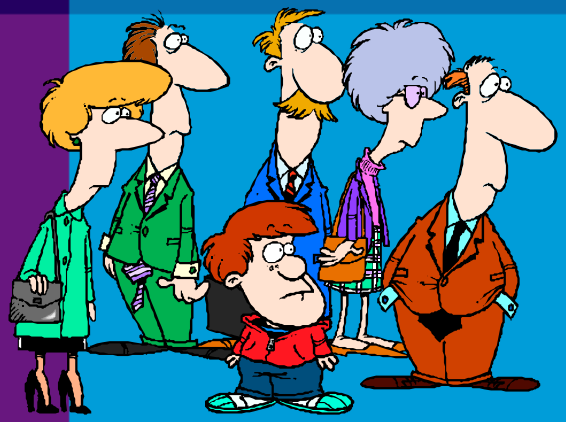
Observation 2: risks are persistent

Societal feedback



Society

unsafe

Catchment area

Observation

Measures

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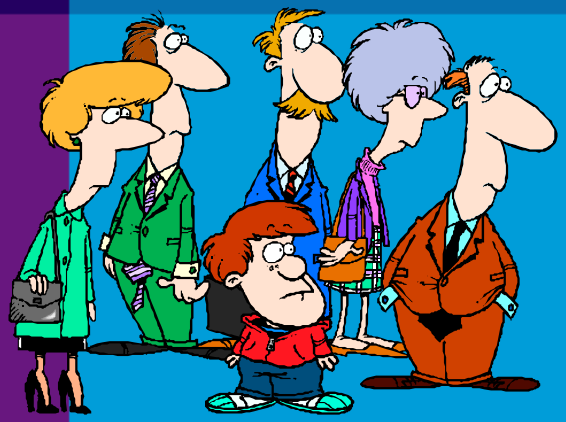
Societal feedback



Society

Observations

safe

Catchment area

Adaptation

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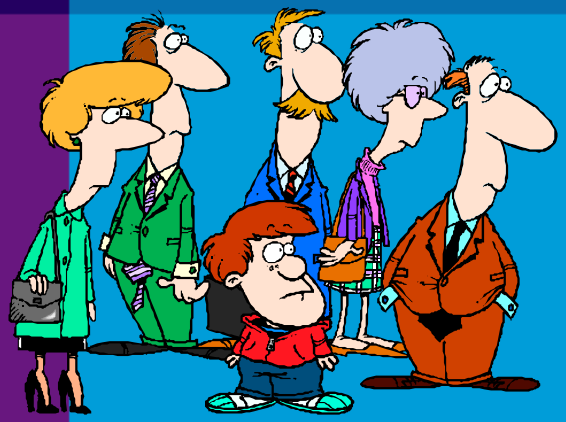
Societal feedback



Society

unsafe

Catchment area

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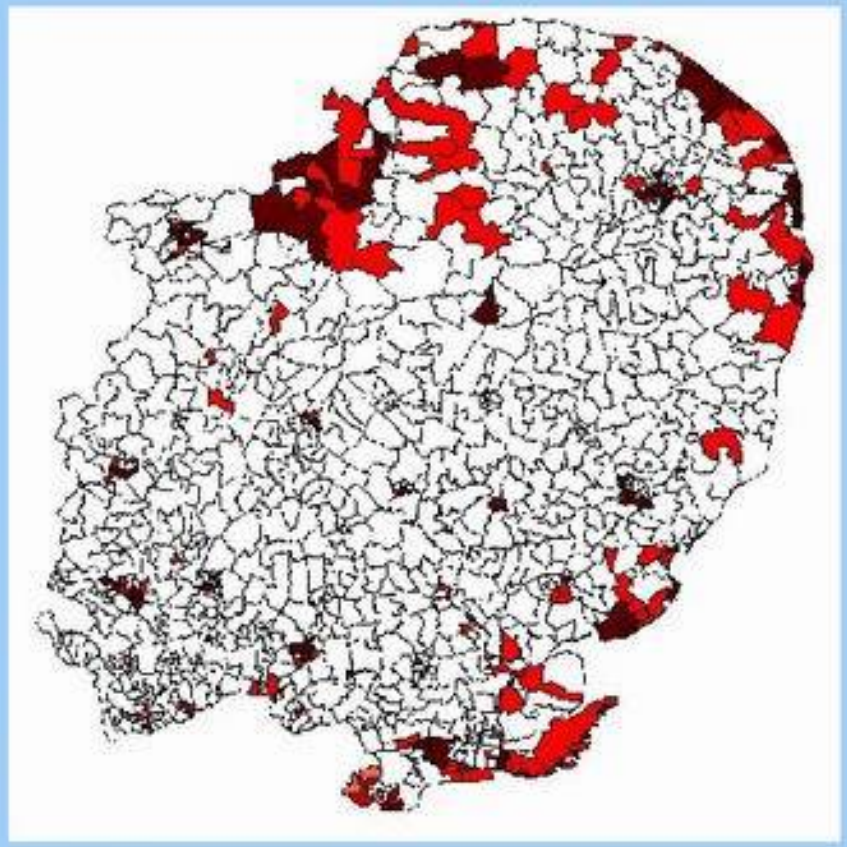
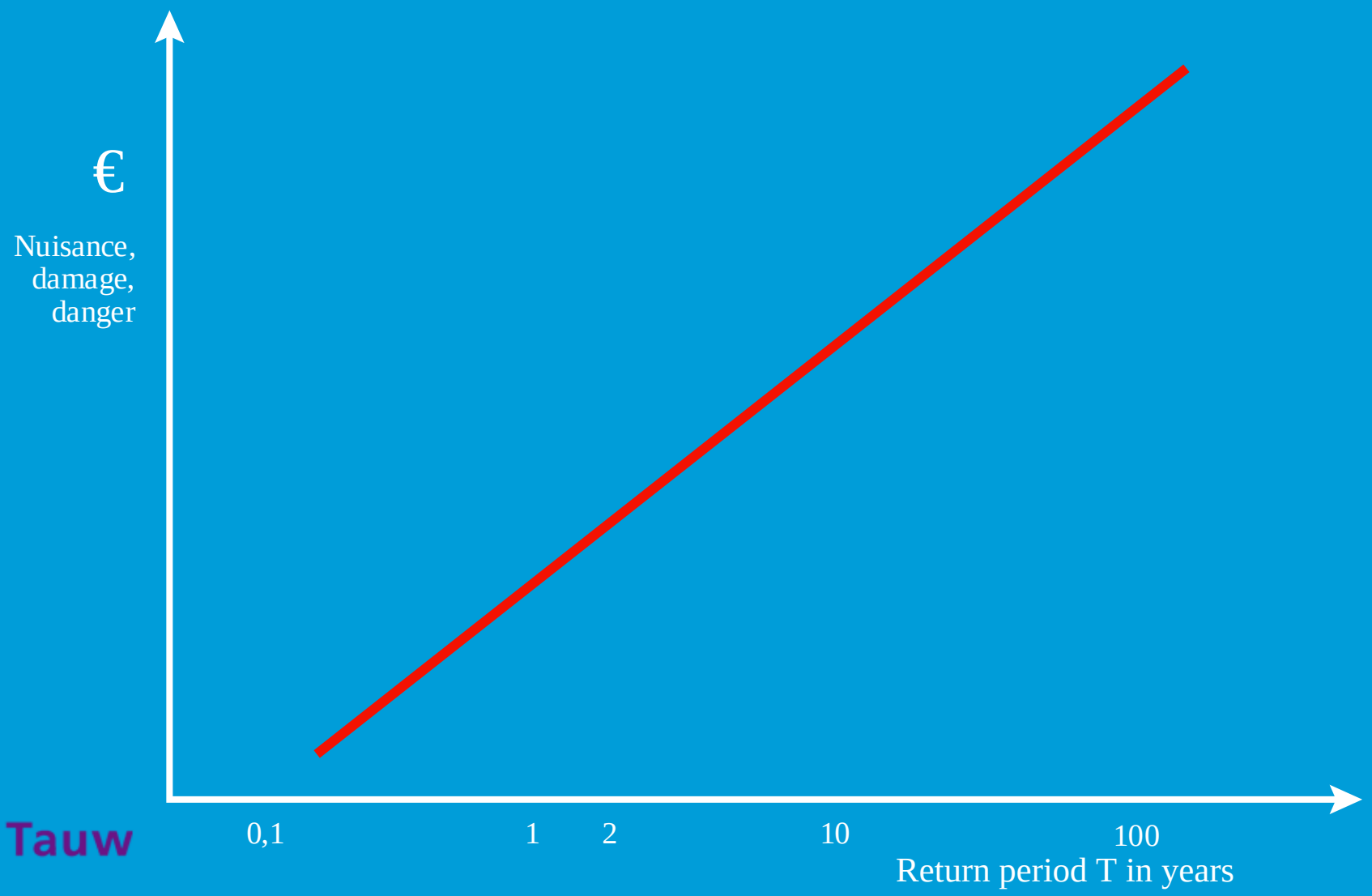
The relationship between water management & society (East Anglia, England)



Flood risk areas

Multiple deprivation

Self-organised criticality (SOC)



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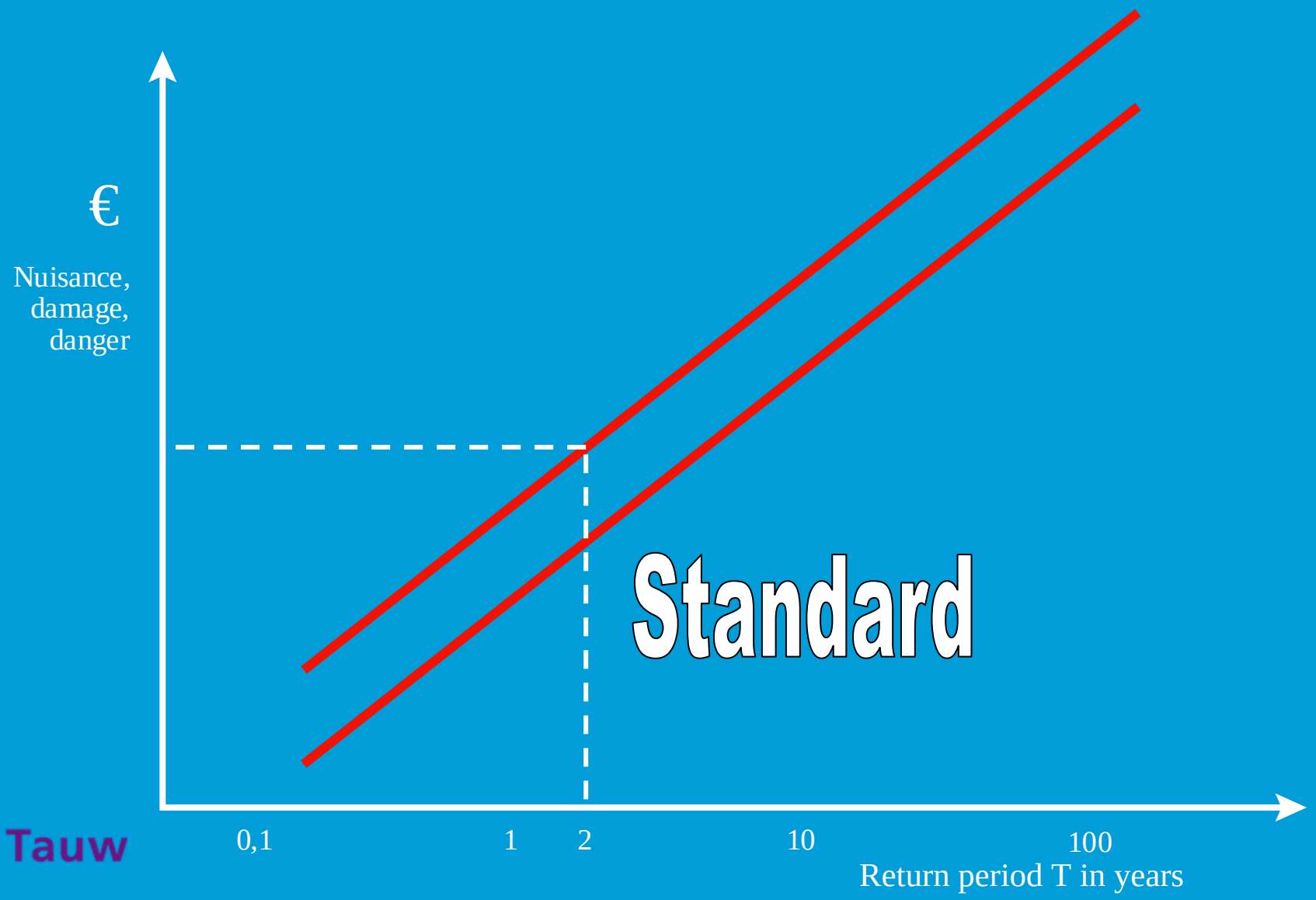
Effect climate change



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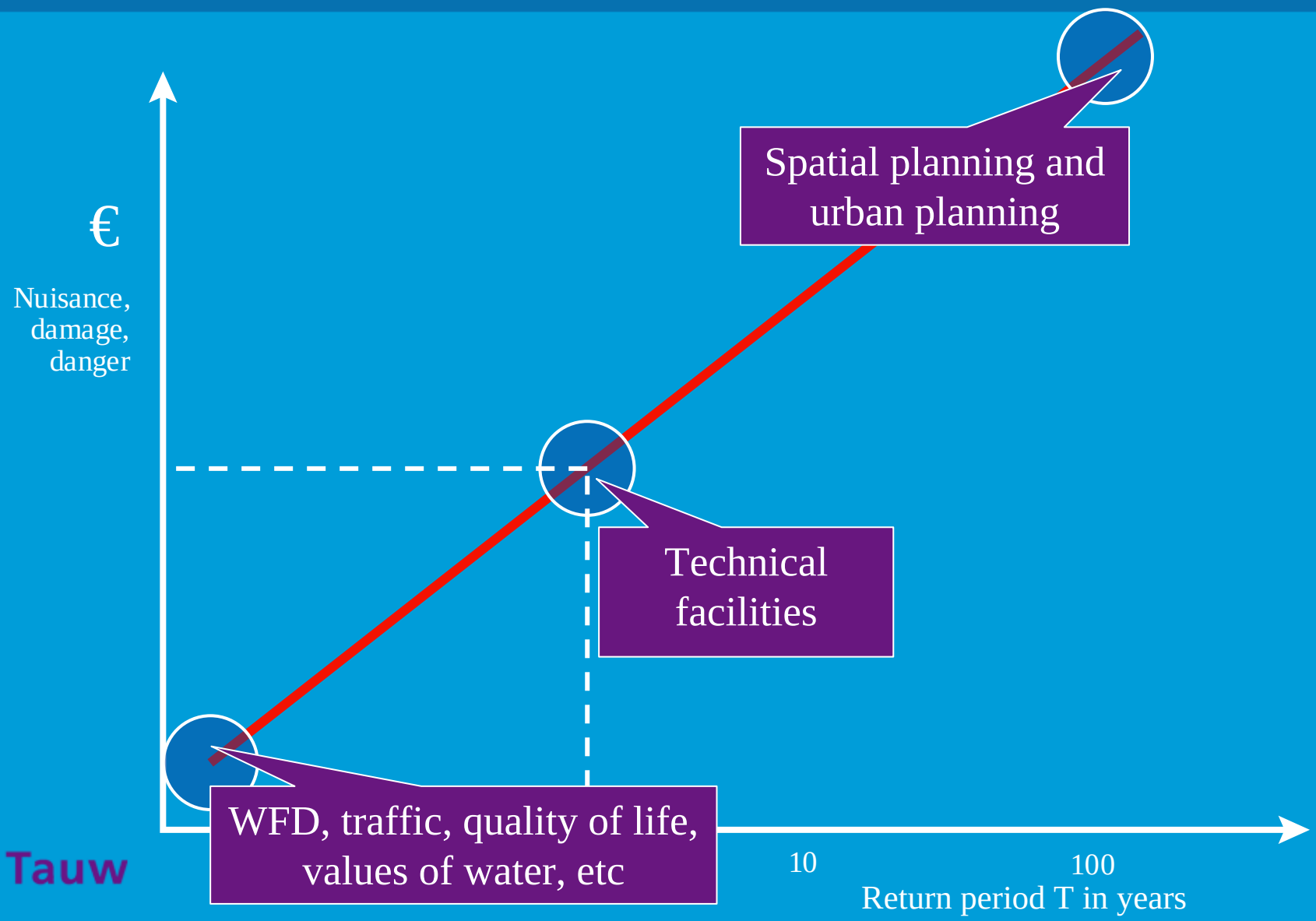
Three points approach



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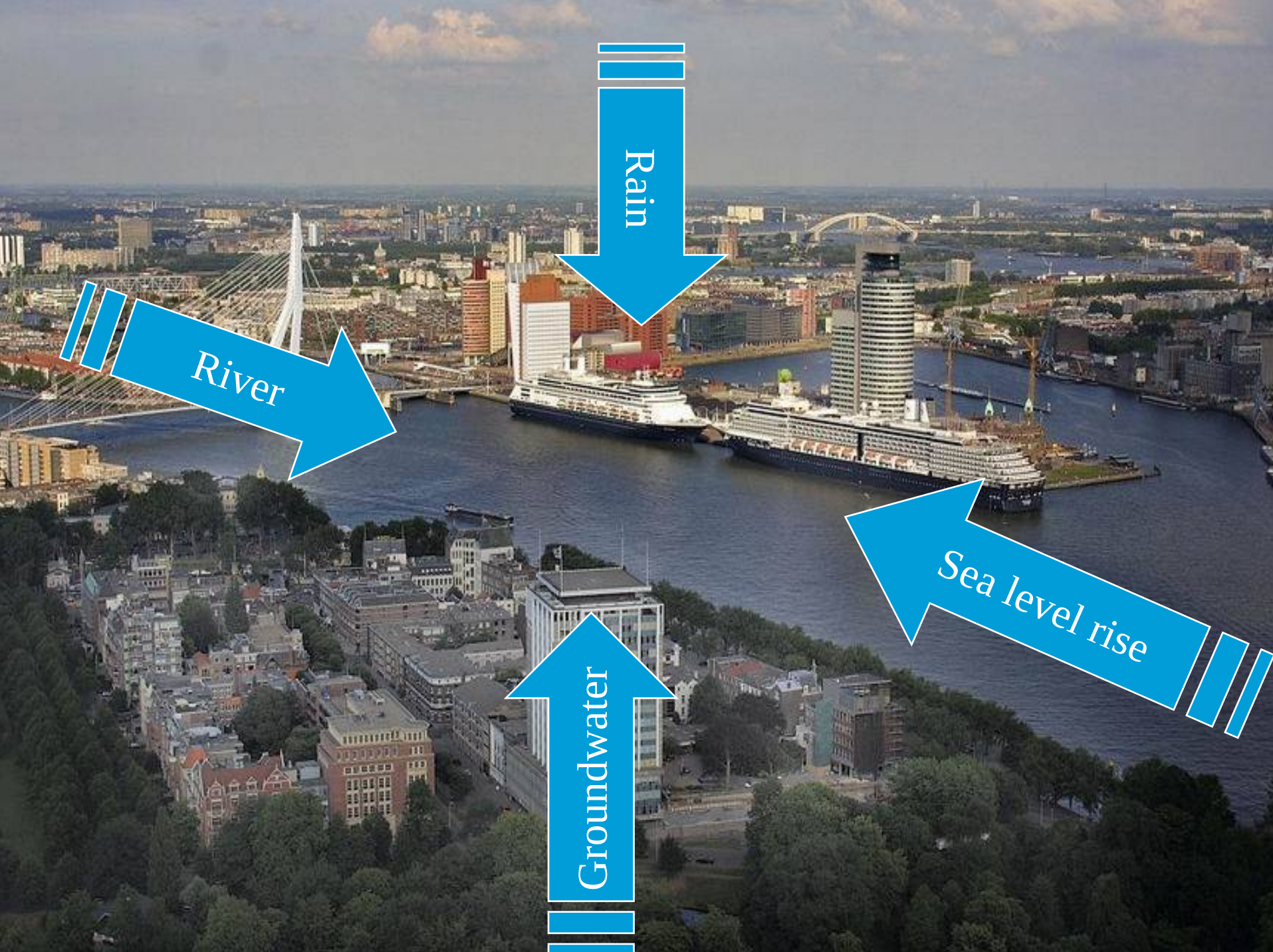
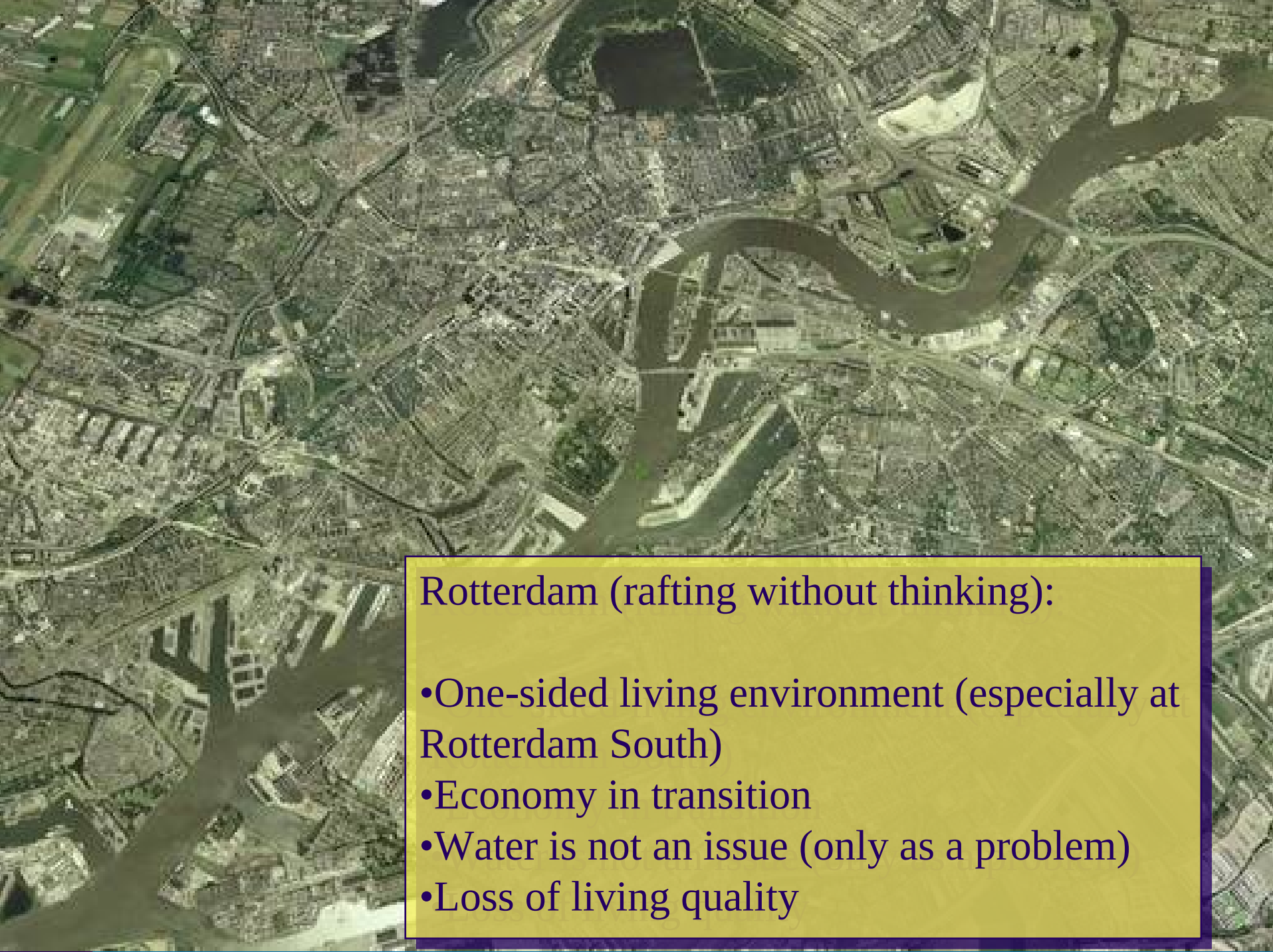
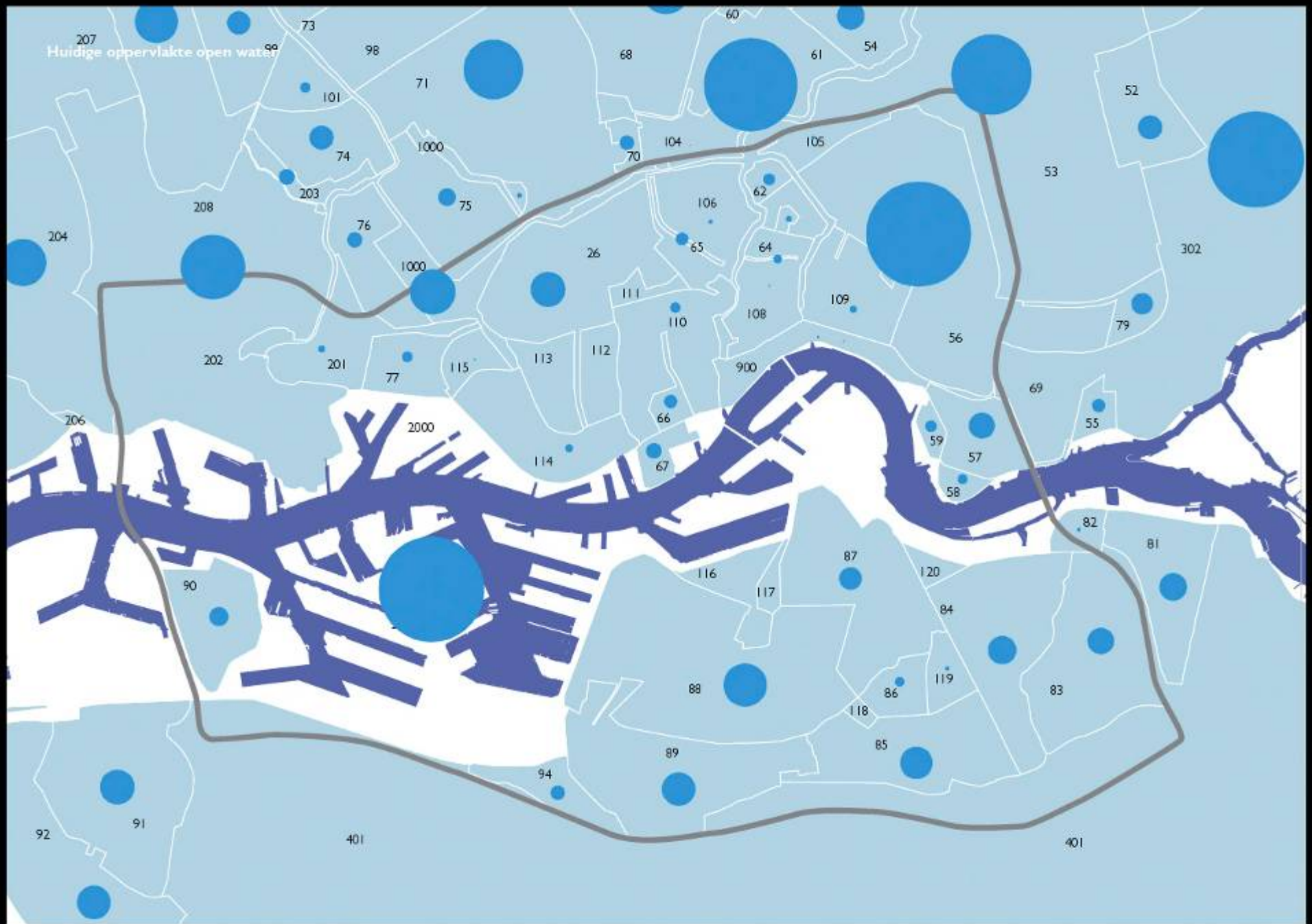

Rain
River
Sea level rise
Groundwater



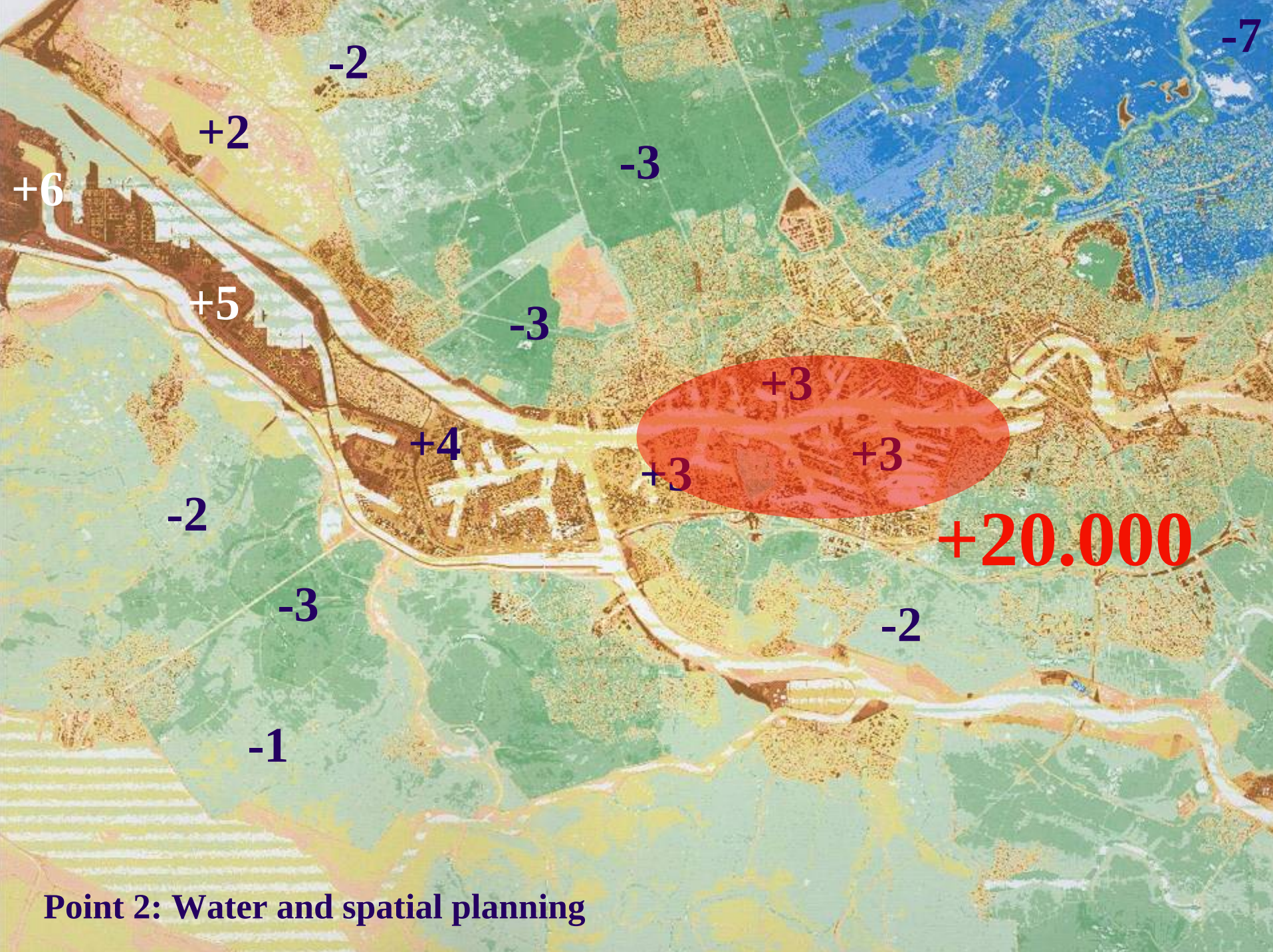
Rotterdam (rafting without thinking):

•One-sided living environment (especially at Rotterdam South)
•Economy in transition
•Water is not an issue (only as a problem)
•Loss of living quality

Point 1: meeting the standards



Urban floods



Point 2: Water and spatial planning

Rotterdam WaterStad 2035

The Atlantis scenario

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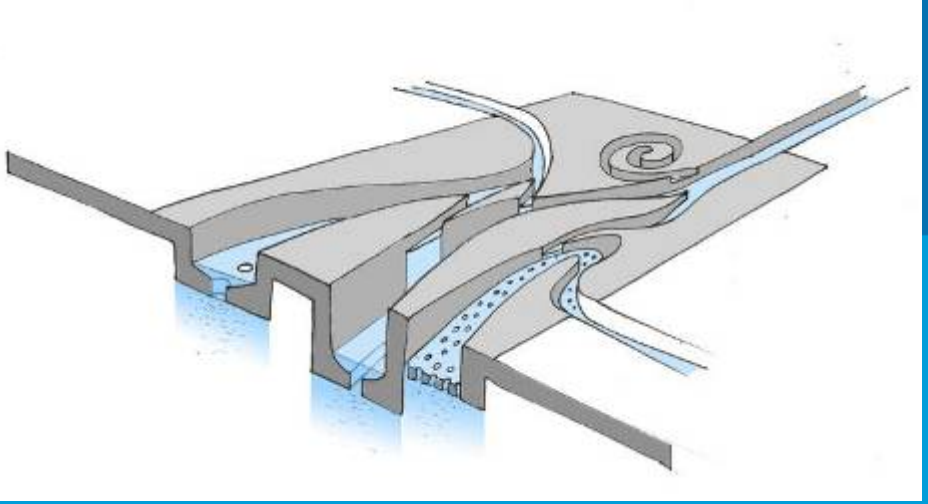

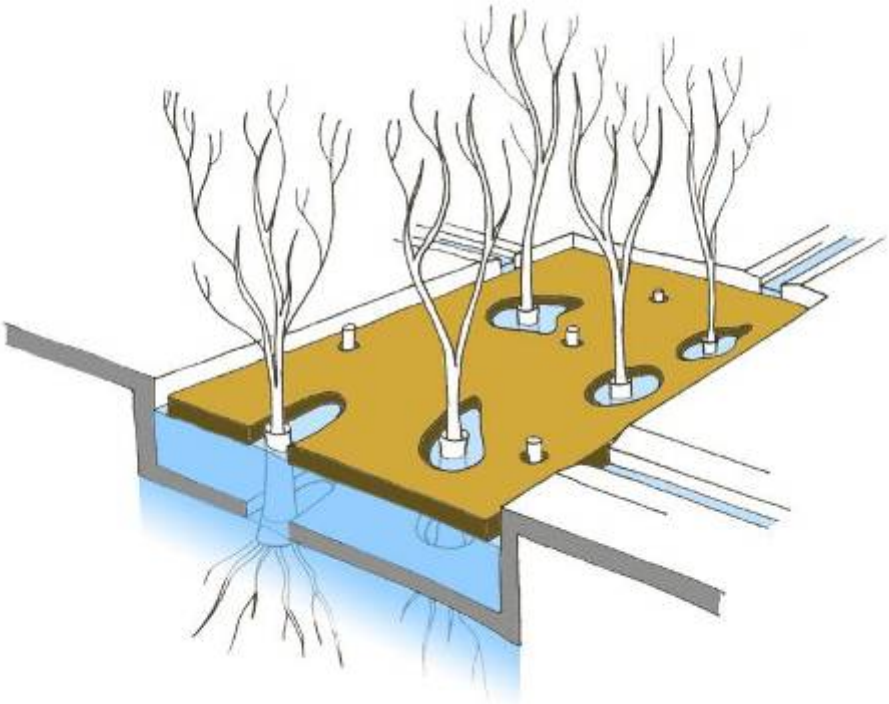

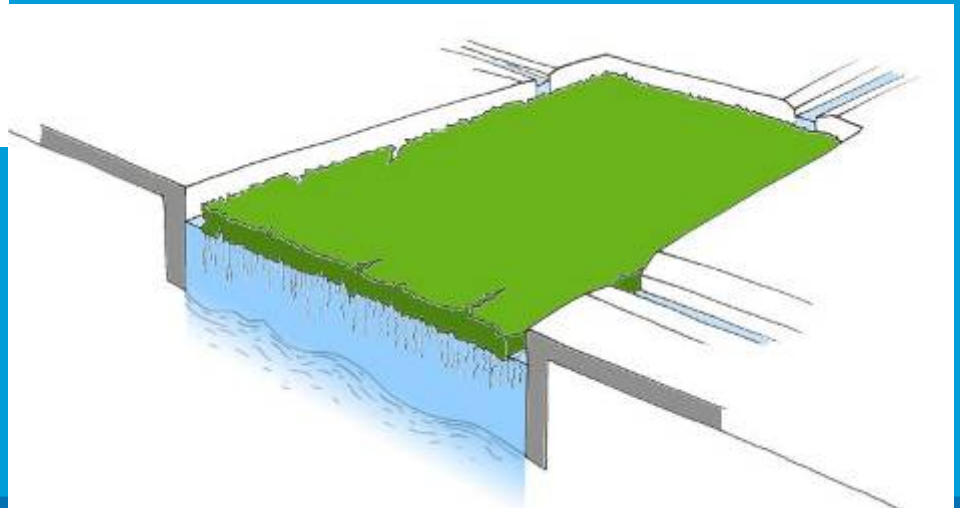

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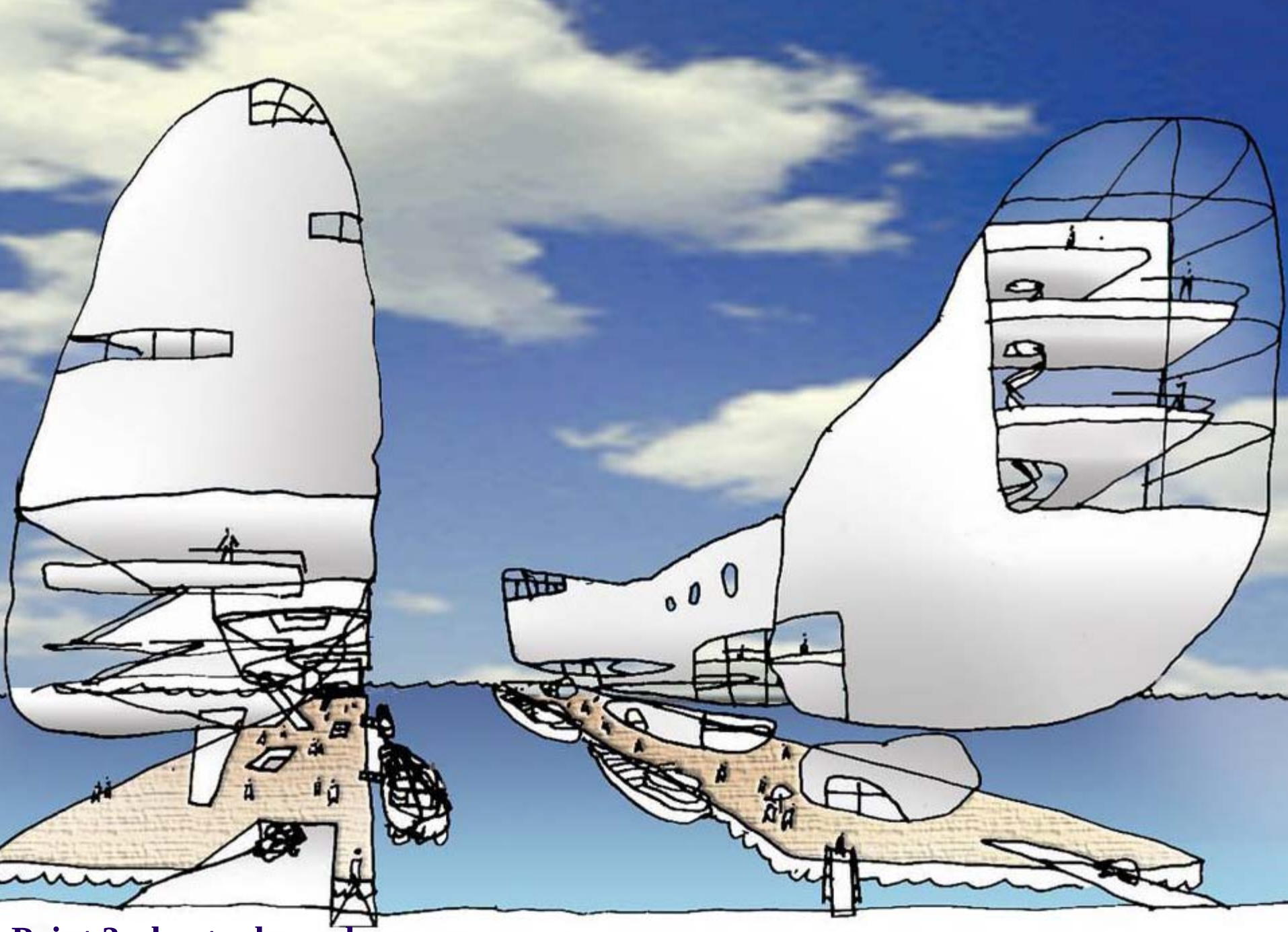
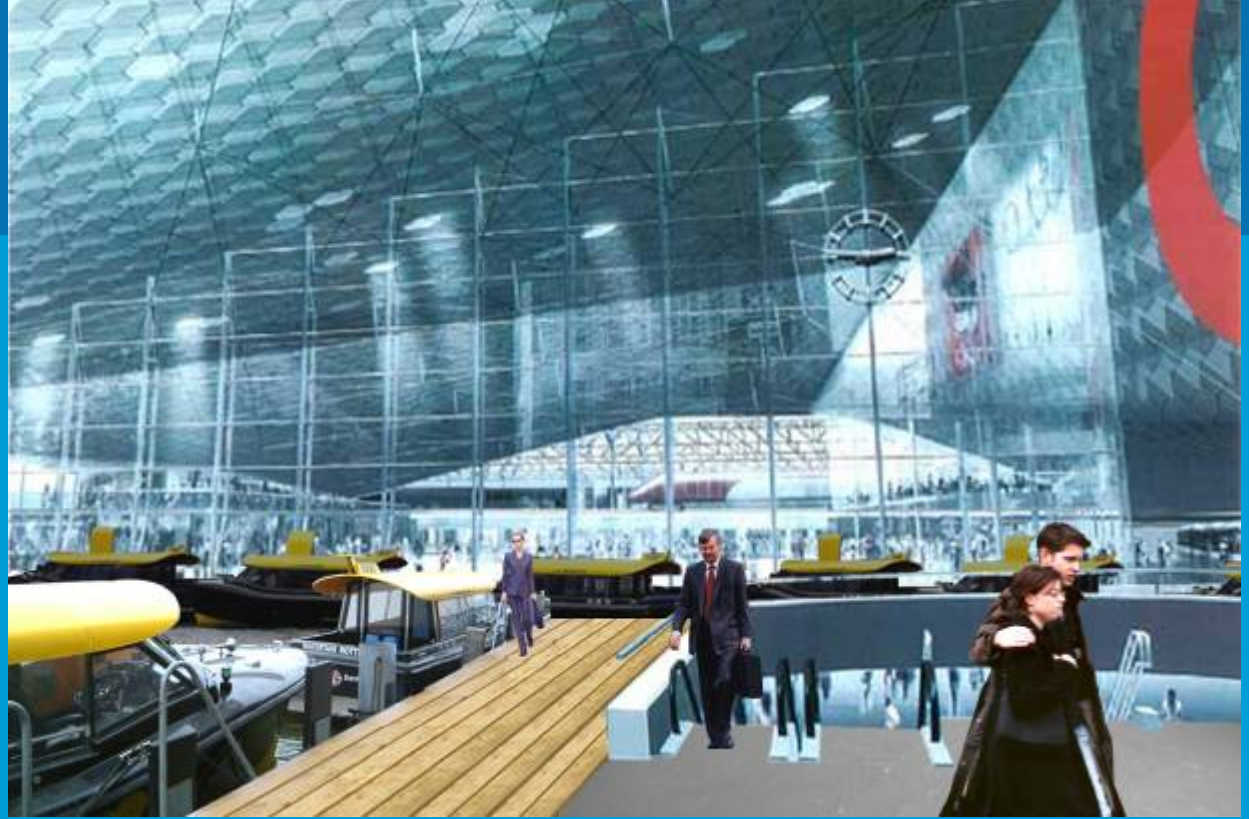


Point 3: day to day values



THALYS

TAXI

Coping with stormwater

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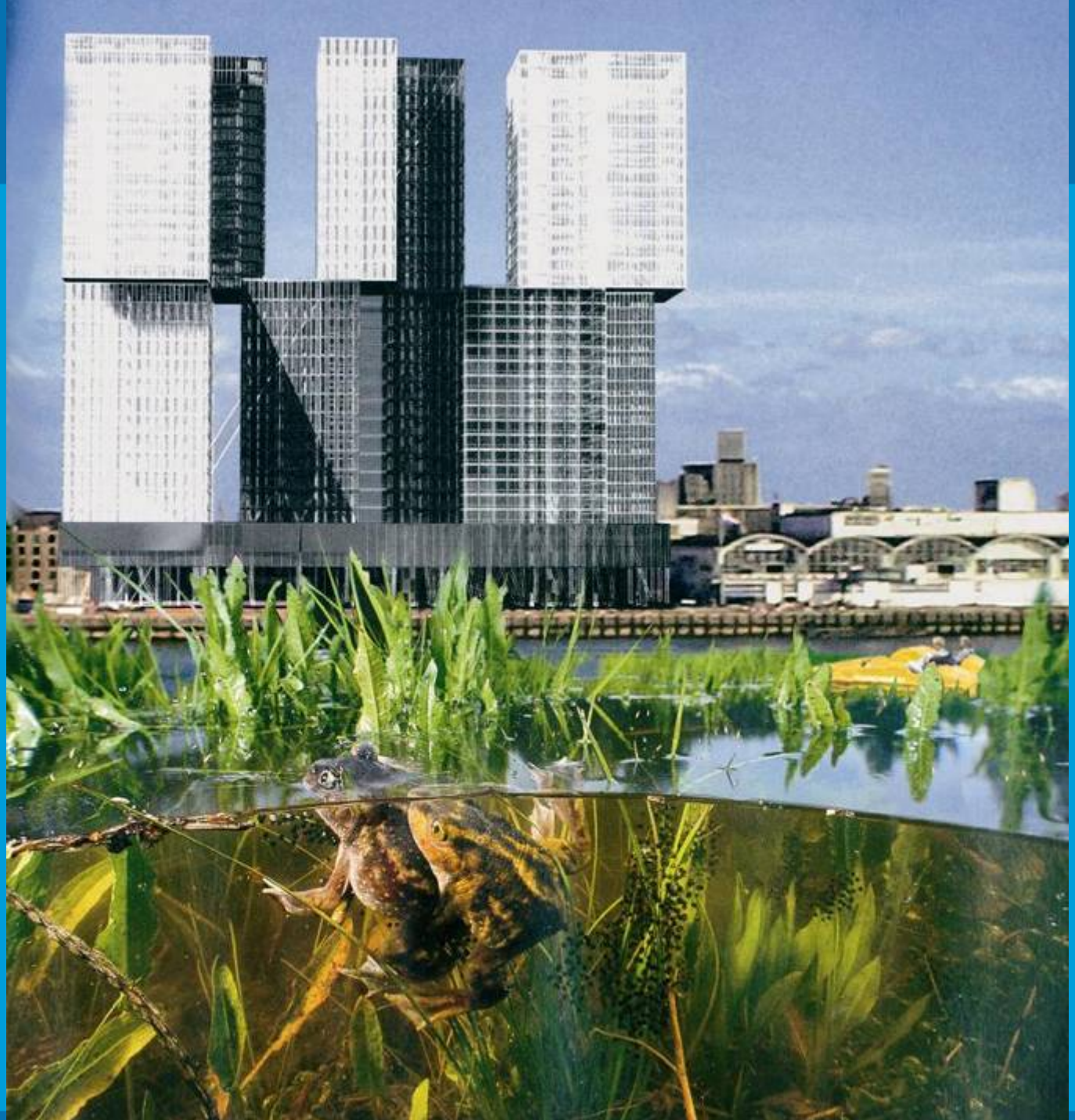

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Economic aspects

- Rotterdam attractive for investments (“economy is 80% psychology”)
- Three dimensions of costs and benefits:
  - The balance of direct costs and benefits
  - The balance of indirect costs and benefits
  - The balance of investments now and returns in the future
- Adaptive strategy

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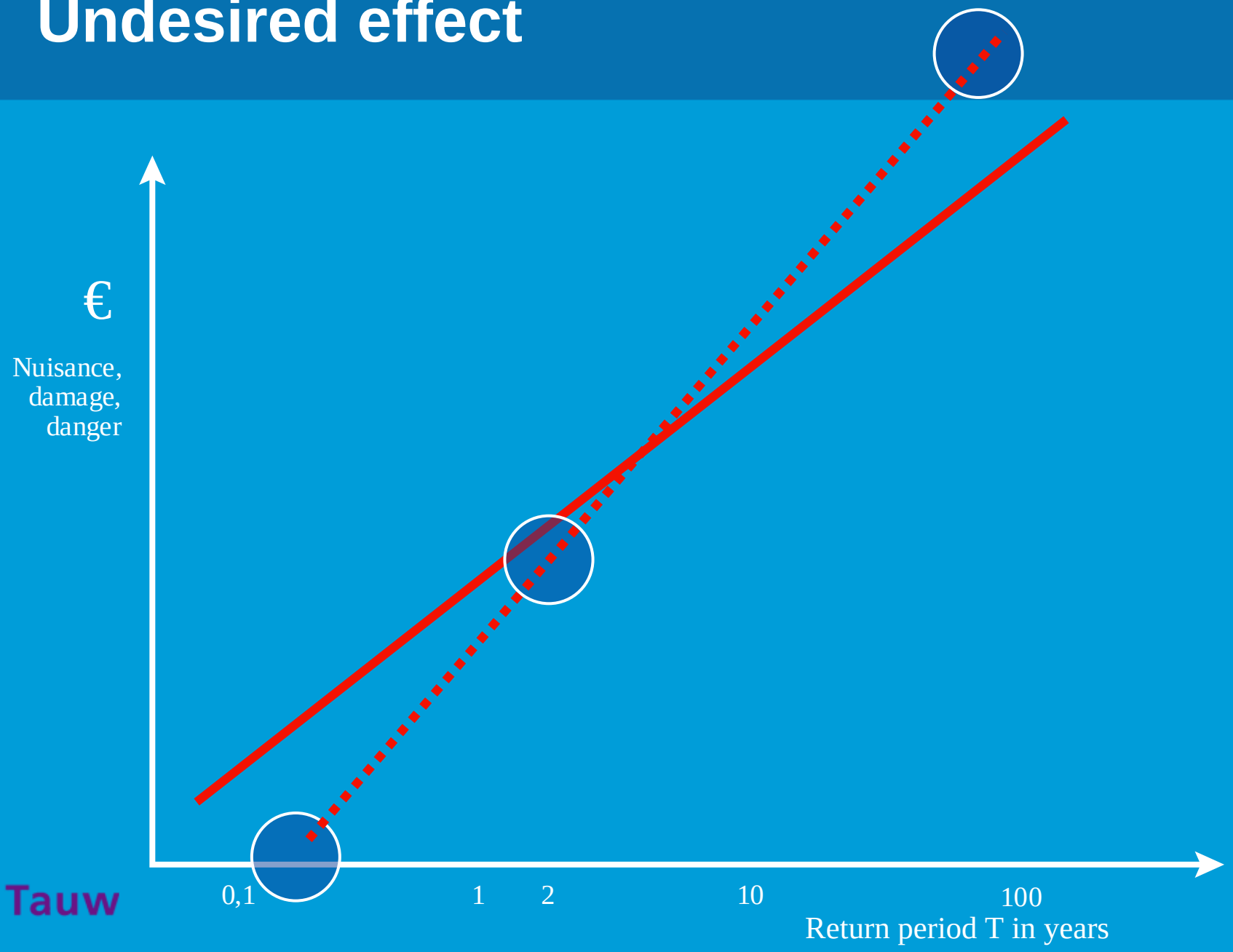
Undesired effect



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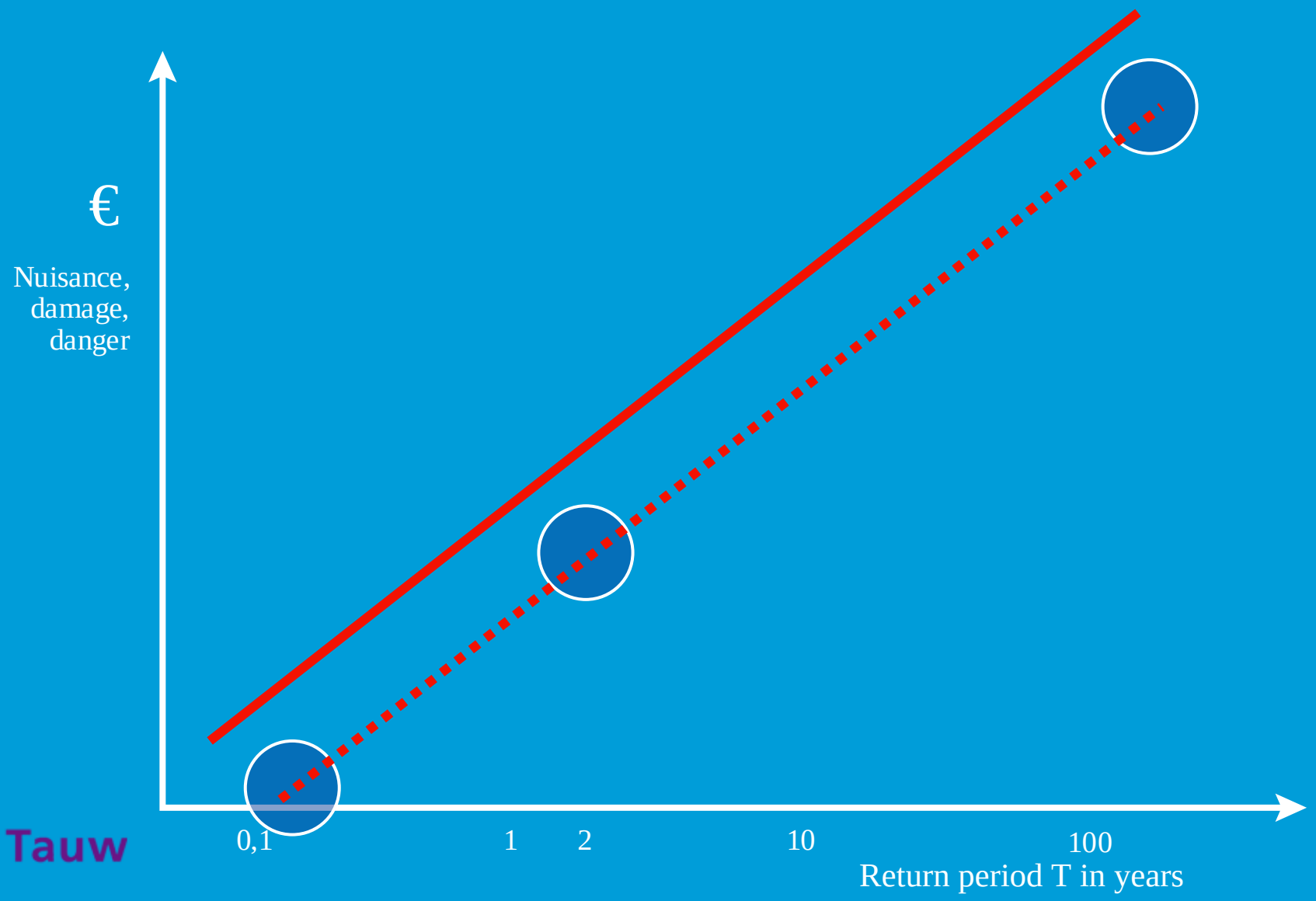
Desired effect



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Conclusions

- In the whole of Europe we are experiencing the effects of climate change (flooding and droughts)
- Practitioners have both technical and societal questions
- Answering these questions is complex, so it makes sense to use insights from complexity science
- A system jump is needed from ‘reactive’ to ‘pro-active’ (we are at a bifurcation point)
- Floods in society are self-organised critical
- The Three Points Approach is a method for practitioners that helps to connect (1) technical aspects and (2) spatial and urban planning to (3) day to day values
- Rotterdam Water City 2035 shows that looking at the three points in combination helps to develop a strategy for adaptation

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Thanks for your attention