Netherlands Commission for Environmental Assessment

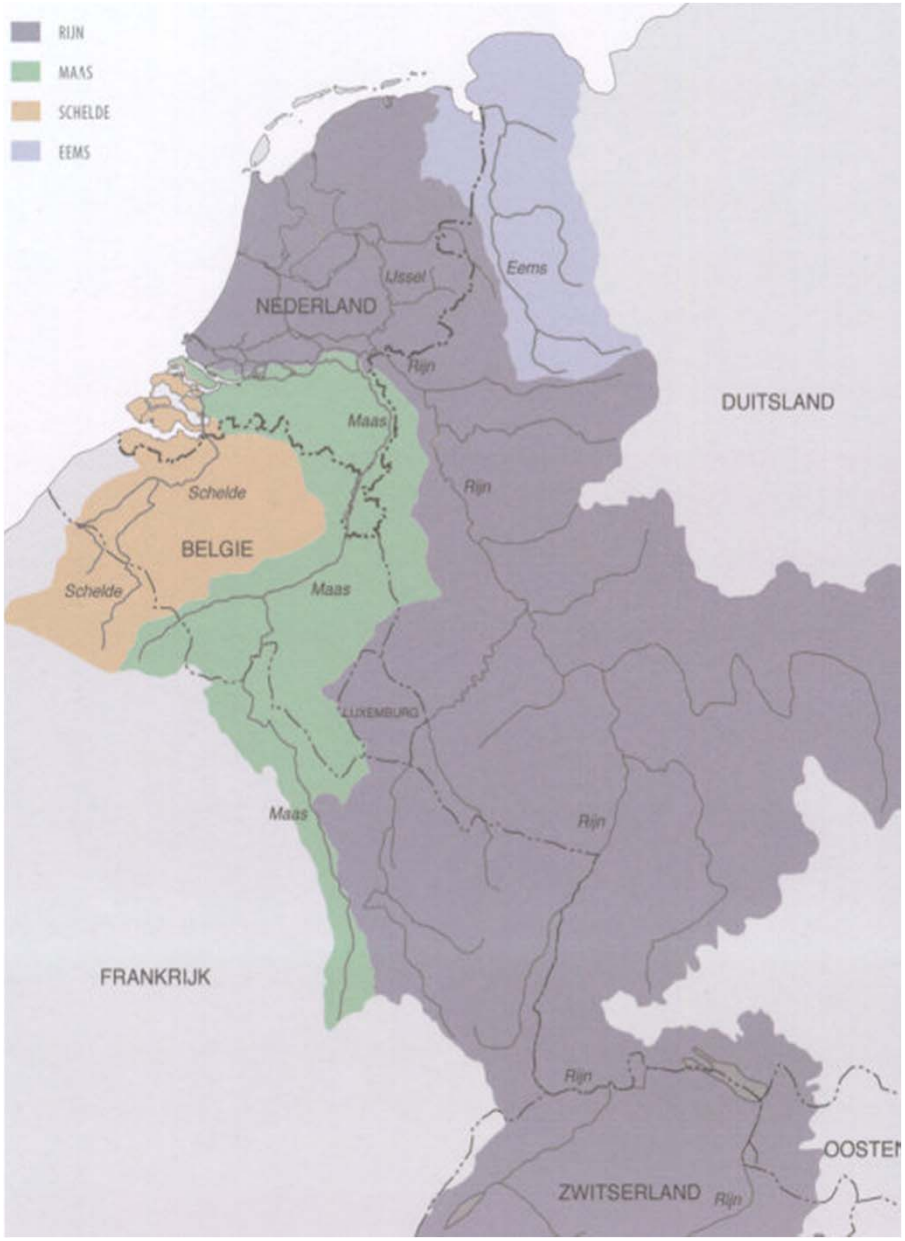
Arend Kolhoff, Bangkok October 2011

SEA & flood management

Case study: SEA for the Dutch national plan on river flood protection

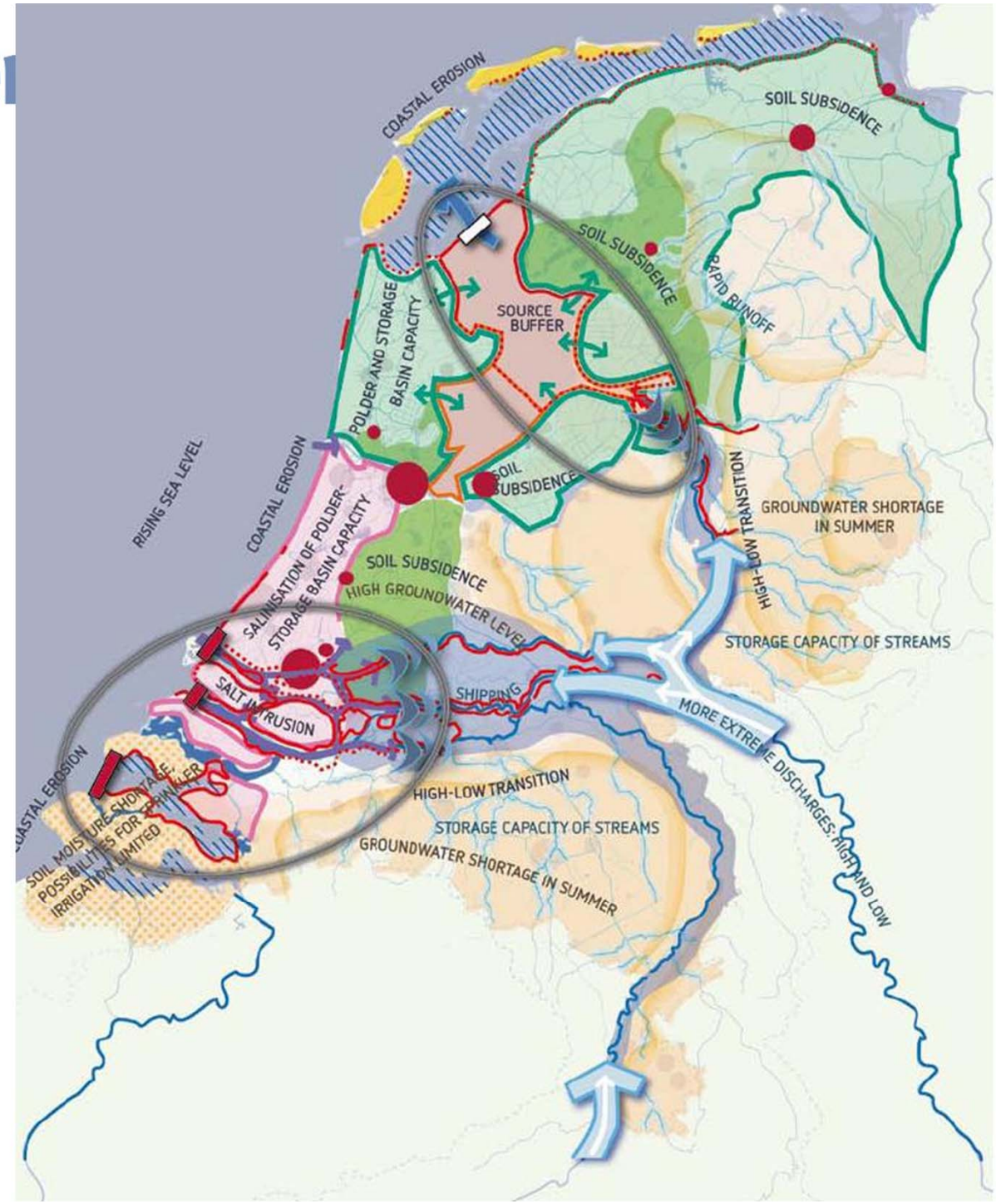
The Netherlands:

- Population 16.5 M
- Delta for 3 rivers
- Dyke construction for 1200 years



Map 3

Key water tasks



large, multiple task with supraregional impact

water quality and freshwater supply under pressure

water supply from IJsselmeer under pressure

saltwater wedge intruding further inland, inlet points under pressure

potential shortage of soil moisture

attention to level management and quality in IJsselmeer area

area subject to subsidence

city in area with high level of subsidence

increase in extremely high river discharges

lower average summer discharge in rivers, extremely low more often

high-low transition sensitive to flooding/ waterlogging

periodical flooding in stream valleys

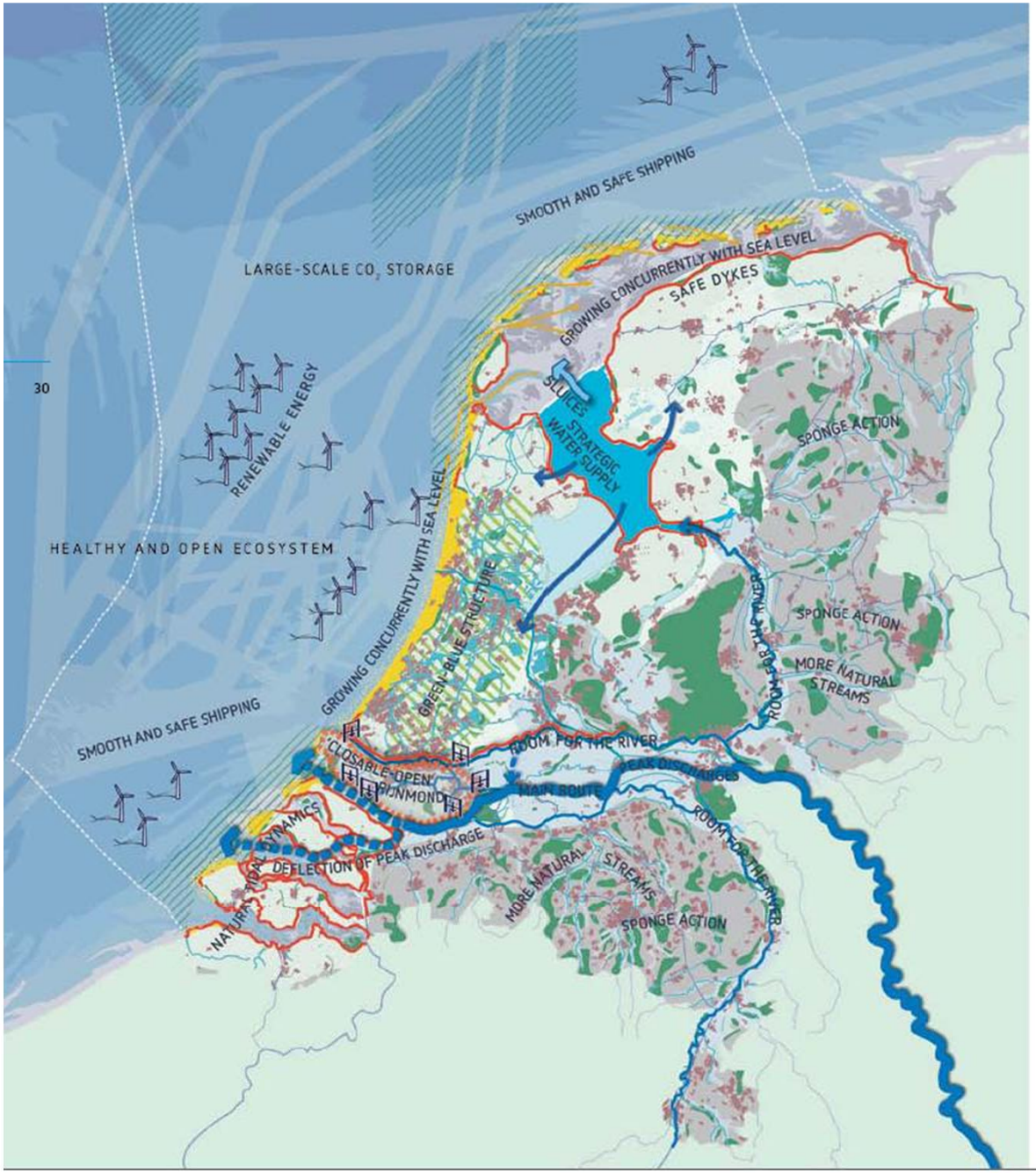
salt meadows and sandbanks can become submerged after rise in sea level

attention to height and stability of flood defences (2008-2050 period)

attention to height and stability of flood defences (2050-2100 period)

drainage capacity of IJsselmeer under pressure when sea level rises

area of influence of sea/IJsselmeer moves upstream when sea level rises



Map 4

Target Situation

target situation

- safe dykes
- closable-open Rijnmond ring
- flood defences
- growing concurrently with sea level
- Waal, main route for peak discharges
- deflecting rivers' peak discharges via delta to the sea
- area around the rivers: Room for the River
- green-blue structure
- natural tidal dynamics
- strategic water supply
- drain excess water to Wadden Sea
- sponge action
- more natural streams
- smooth and safe shipping
- renewable energy
- nature areas at sea

subsoil

- urban area (situation around 2015)
- nature and forests
- sandy soils
- area around the rivers
- peat grassland
- marine clay
- dunes
- lakes
- sea

Starting points

- Safety decreases (risk of flooding)
- Changing view on flood protection
  - shift from dyke heigthening and strengthening to creating more space in the river foreland
- Maximum budget € 2.000.000.000

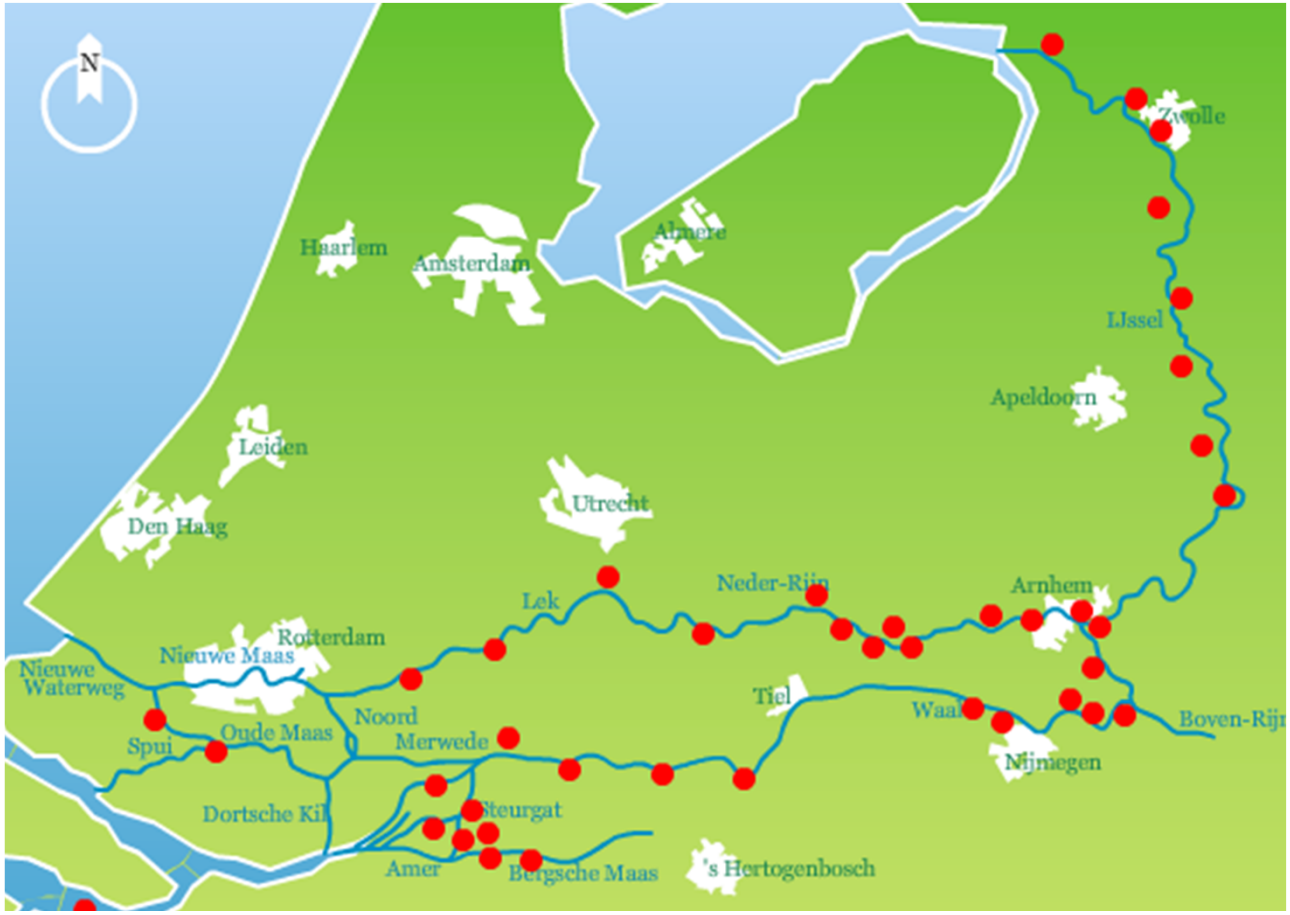
Climate proofing in the SEA

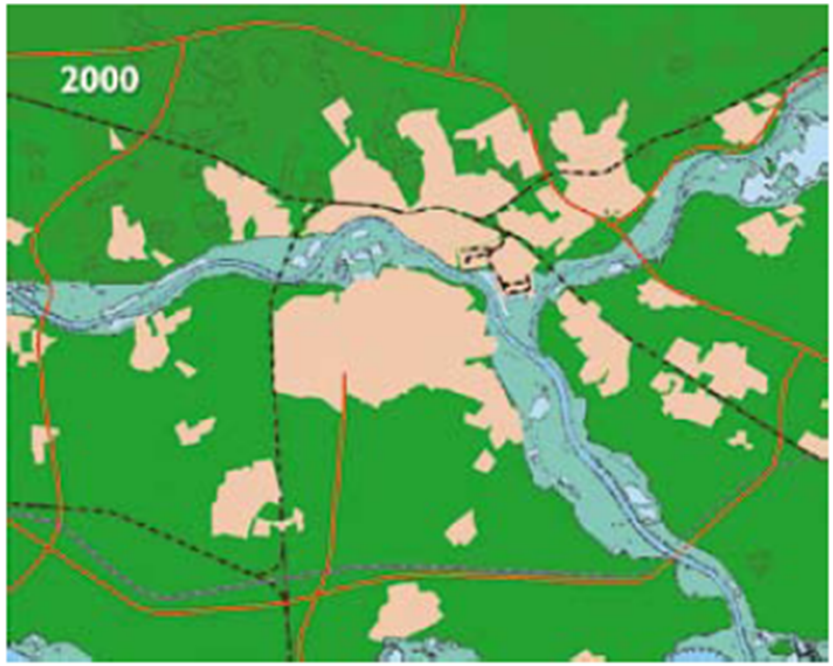
- Prediction of high water river levels in the year 2100 on basis of IPCC mid scenario
- Analysis of upstream developments until 2020 (outside of the Netherlands)
- 1 and 2 combined: future high water levels in The Netherlands, both mid term & long term

Objectives

- Realise a higher discharge capacity for the Rhine by 2015 (16,000 m3/second)
- Maintain safety level 1:1350
- Improve the quality of the environment of the river basin
- Provide extra space the rivers will need throughout the coming decades

Scope of the SEA

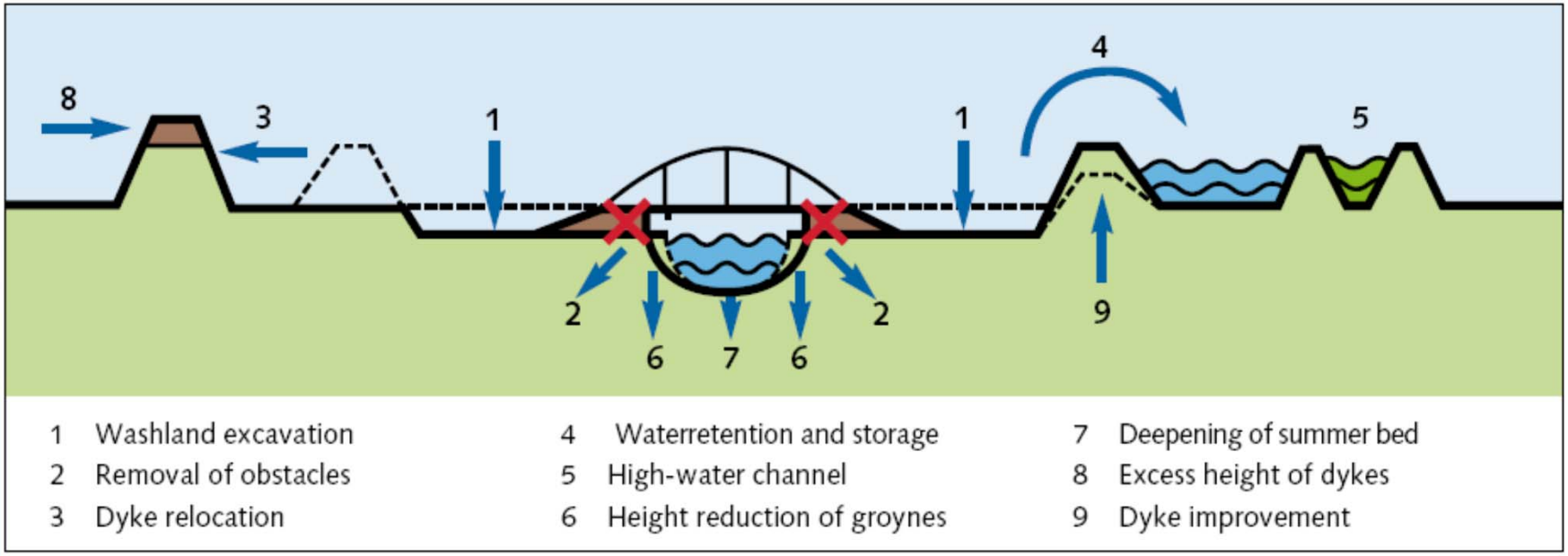




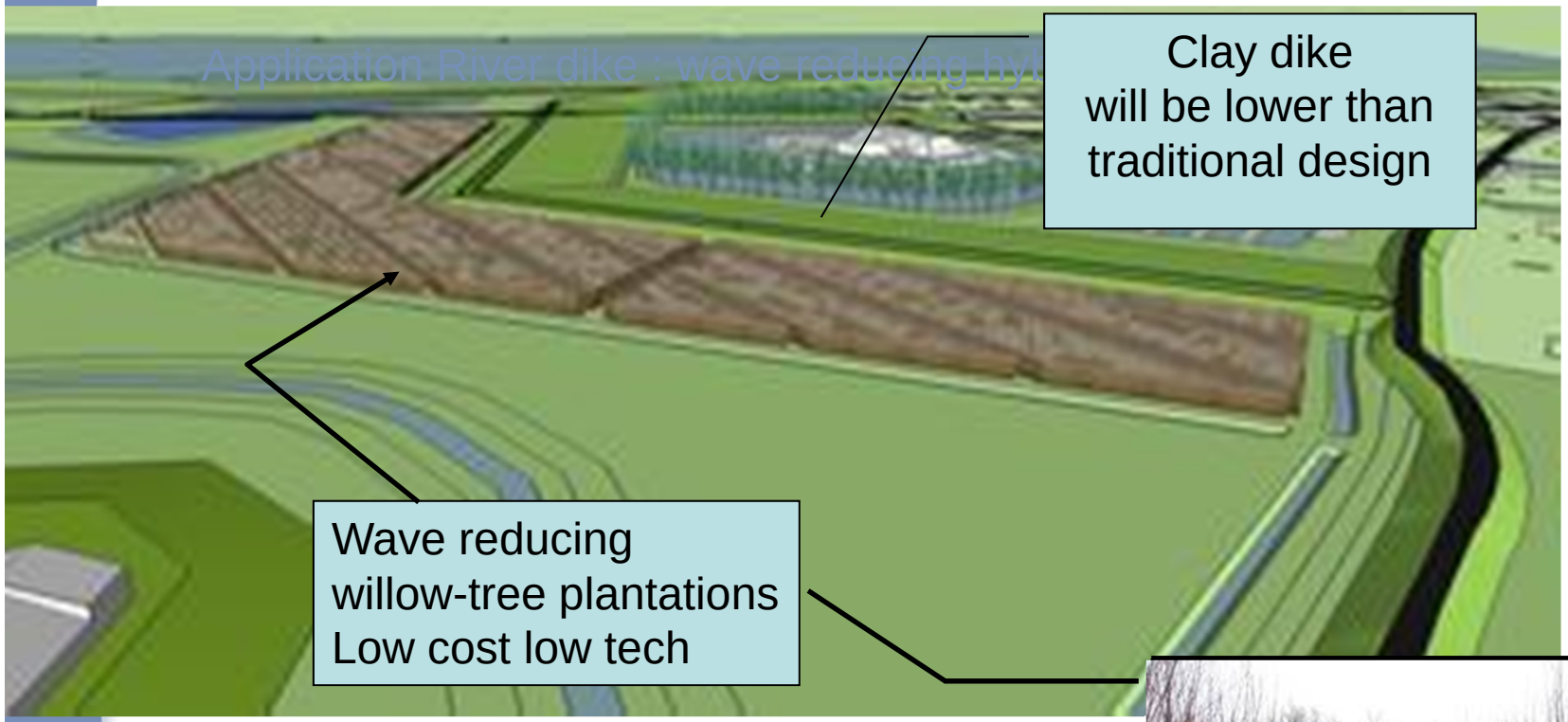
Urban development in the Arnhem area

Alternatives

Types of measures:



1	Washland excavation	4	Waterretention and storage	7	Deepening of summer bed
2	Removal of obstacles	5	High-water channel	8	Excess height of dykes
3	Dyke relocation	6	Height reduction of groynes	9	Dyke improvement



Deltares concept and design has now been officially accepted to achieve required 1/2000 safety standards and is integrated in this 300 million euro project

Design of the participation process

- Continuous participation throughout the plan process:
  - 2 regional steering groups with representatives from government agencies and NGOs (e.g. agriculture, environment)
  - Establishment of regional offices
  - Public meetings at 15 locations.

Dedicated website

Inter agency cooperation

- Plan process ánd SEA managed by a ‘project agency’ of all ministries involved

Alternatives

- Reference: safety through improving existing dike
- Alt 1: dike improvement & discharge improvement
- Alt 2: discharge improvement & nature and landscape development
- Alt 3: combination of 1 and 2

Impact assessment

- Combination of quantitative assessment and expert judgement
- All impacts valued through expert judgement
- Economic costs: cost benefit analysis
  - cost of flooding versus cost of measures

Issues and indicators

Issue	**Indicator**
safety	impacts of measures on lowering of expected high water levels
management & maintenance	need for dredging operations
spatial quality	utility value of the area
	perceived quality of the area (on the basis of objective criteria)
	robustness to change/flexibility

Comparison of alternatives

- Both quantitatively (comparison of scores) and qualitatively (description of pros and cons of alternatives)
- Sensitivity analysis
- Conclusion:
  - Alternative 2 better than 1
  - Best: alt. 2 with some elements of 1 (= Alt 3)

Decision

- Cabinet decided:
  - Focus on **hydraulic** measures: increased storage and discharge capacity of rivers, because most **cost effective**
  - Focus on measures **combining safety** and improved **environment** (e.g. nature, landscape and recreation)

Influence of the SEA

- Cabinet decision is almost 100% best scoring alternative in the SEA
- Decision accepted by all parties, without much controversy
  - exception: deposits for contaminated soil

Lessons learned

- Most succesful SEA elements were:
  - Management by a joint project agency of all ministries involved
  - Flexibility of the process
  - Interactive plan development, in parallel with stakeholders consultation