PBL Netherlands Environmental Assessment Agency

National assessments to support the Dutch government: Climate vulnerability & adaptation as an example

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PBL Mission

PBL contributes to improving the quality of political and administrative decision-making by conducting trend and outlook studies, analyses and evaluations in which an integrated approach is considered paramount.

Policy relevance is the prime concern in all our studies.

PBL Products

- Around 80 reports (evaluations, outlooks, policy briefs, scientific background reports)
- Around 70 papers, annually (scientific publications, contributions scientific journals, policy papers, etc.)
- Models and data
- Policy briefings, workshops, symposia, presentations, etc.
- External services (e.g. support regions, ministry & EC)

Some recent publications

This presentation: strategic options for a climate proof development of the Netherlands

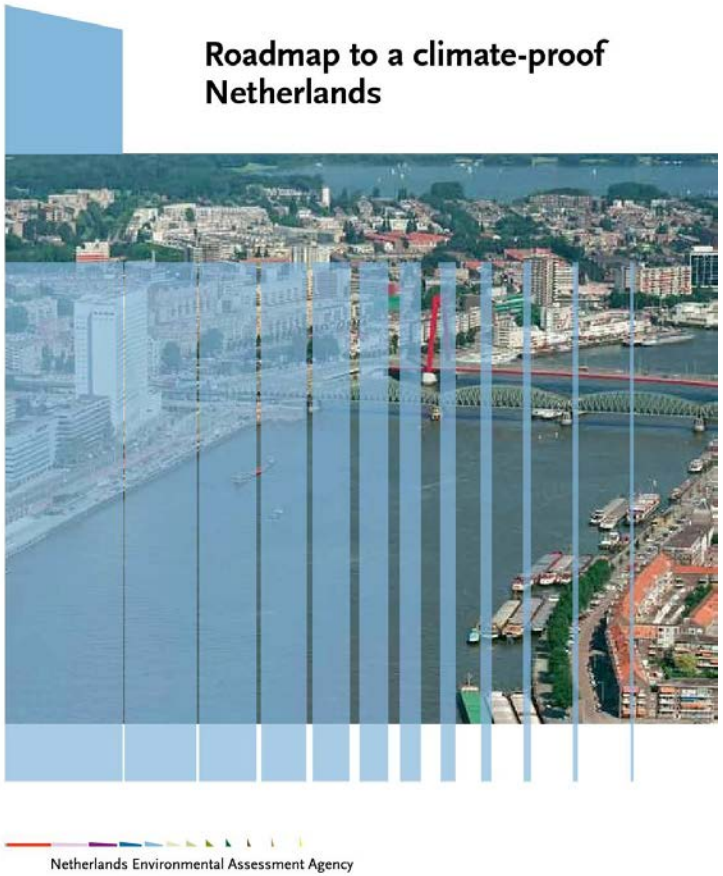
History: original request from Ministry of VROM

- Ministry of VROM was coordinating Ministery for adaptation. Question to PBL in 2008: options for long-term spatial strategy

- PBL: Exploring study 2008/2009 - what are the priorities with relation to spatial development?

- At the same time, Ministry of Transport, Public Works and Water Management launched the 2nd Delta Committee with request on long term strategy related to water (flood protection, water suplies)

- Thus two parallel processes: one broad approach (PBL), one on water (Delta Committee)



Topics addressed:

- **Flood protection**
  (Long term sea level rise)
- **Fresh water availability**
  (drought, water quality, salinisation)
- **Agriculture**
  (water, extreme weather events, diseases)
- **Nature**
  (spatial connectivity, environmental conditions)
- **Human health**
  (heat, air quality, allergies, vector borne diseases)
- **Energy supply**
  (availability of cooling water, link with sust.energy)
- **Transport**
  (air, roads, waterways)
- **Recreation and tourism**
  (improved recreational conditions ⇔ potentially adverse effects)

Spearheads for a climate-proofing the Nederlands

Long term safety strategy against flooding (>2100)
- What if worst-case after 2100? What are the options?
- Consequences for spatial and urban development?

Fresh water strategy:
- Regions self-sufficient ↔ Water supply from national waterbodies
- Adaptation of landuse in the regions? Water supply agriculture?

Reducing vulnarability nature areas
- Improving environmental conditions and spatial connectivity.
- More focus on wet nature values (also of international importance)

Reducing vulnerability urban areas
- Win/win adaptation ↔ mitigation ↔ environmental quality
- Windows of opportunity: new and restructuring urban areas

Different policy areas

Setting of assessment

- After elections new government + reorganisation of ministries

- In 2010 Delta Programme was launched within Ministry of Infrastructure and Environment. Delta Programme focusses on i) flood protection, ii) freshwater supplies and iii) urban development

- Delta Programme started with problem finding phase, involving many stakeholders such as regional authorities and social organisations, while PBL was in phase of exploring strategic solutions

- PBL project was seen as competing process rather than potentially supportive

- Difficult communication process PBL ⇔ Delta Programme 2010/2011, but in the end satisfying solution with PBL report as start of the Delta Programme phase of exploring solutions.

Setting of assessment

- Strategic options of Delta Committee based on high-end climate change scenarios:
    * safety level should be increased by a factor 10
    * IJsselmeer to be developed into a huge water reservoir with water level increase of + 1,5 meters
    * no need for adaptation in spatial development

These statements were the starting point for the Delta Programme. In PBL 2009 we already criticized these options, being not well underpinned by sound analyses.

Update “Effects of climate change in the Netherlands”

- Cooperation with many institutes and universities
- Observed & projected changes
- Opportunities & risks
- Sectors/chapters:
  - Climate System
  - Water: safety & supply & quality
  - Nature & biodiversity
  - Agriculture
  - Health
  - Tourism

Strategic Assessment ‘Climate adaptation in the Dutch delta’

- Identification of strategic options:
  - Flood protection
  - Freshwater supplies
  - Nature & biodiversity
  - Urban development

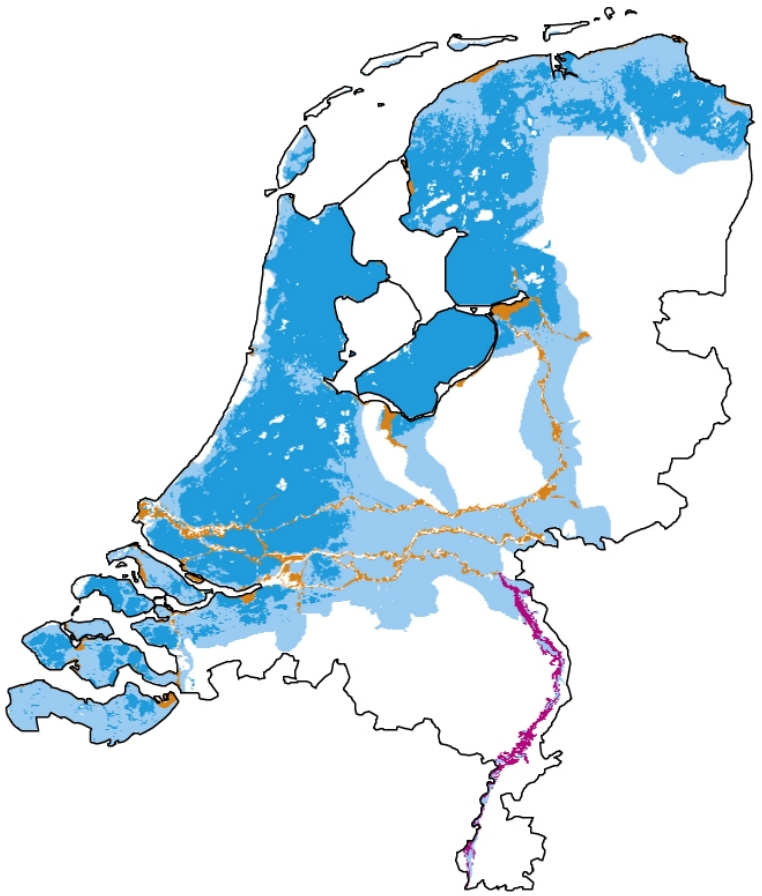
Priorities based on earlier study: PBL 2009

The Netherlands

Setting:

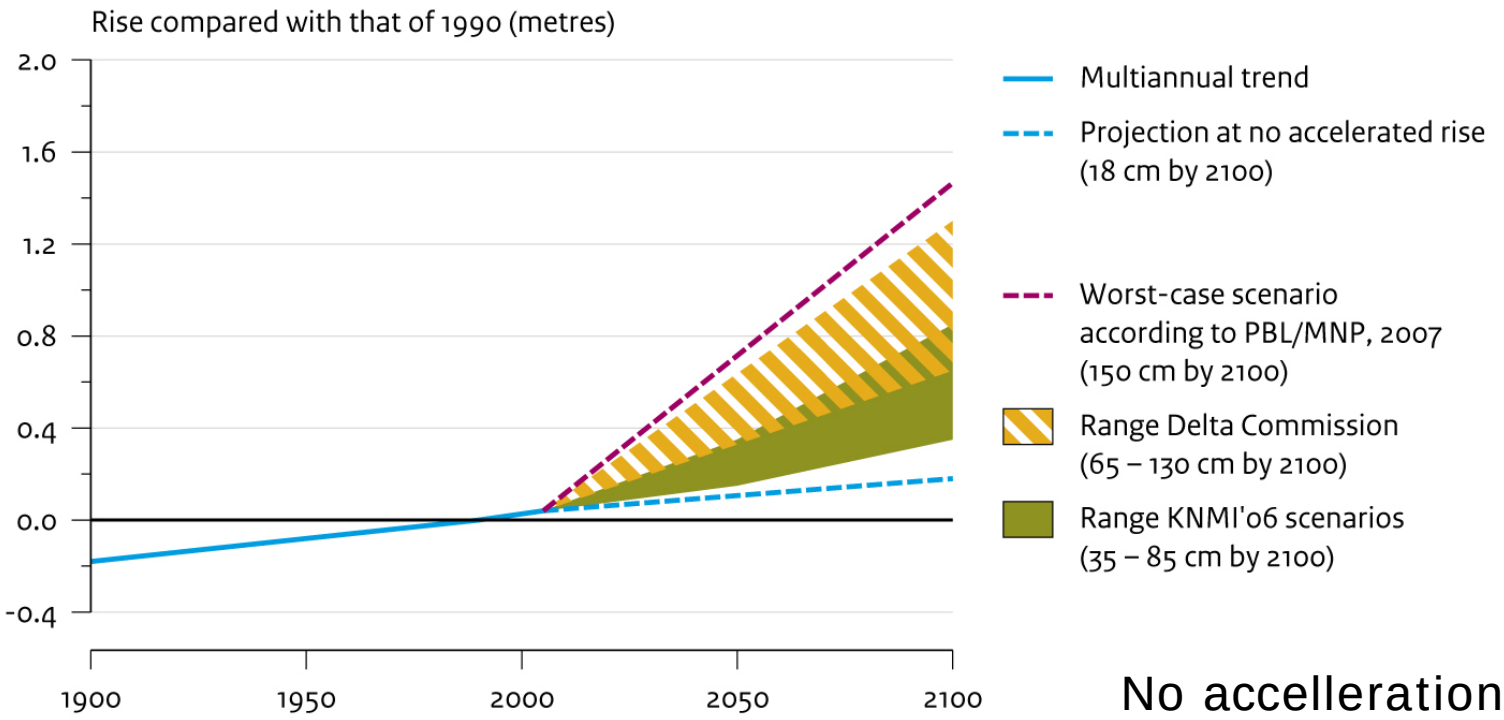
- Small country with a population of 17 million
- Delta of four river basins
- 26% is below sea level
- 60% is susceptible to flooding
- Flood-sensitive area is densely populated
- High level of flood protection (1/1250 to 1/10.000 year)

Flood-prone areas, 2005



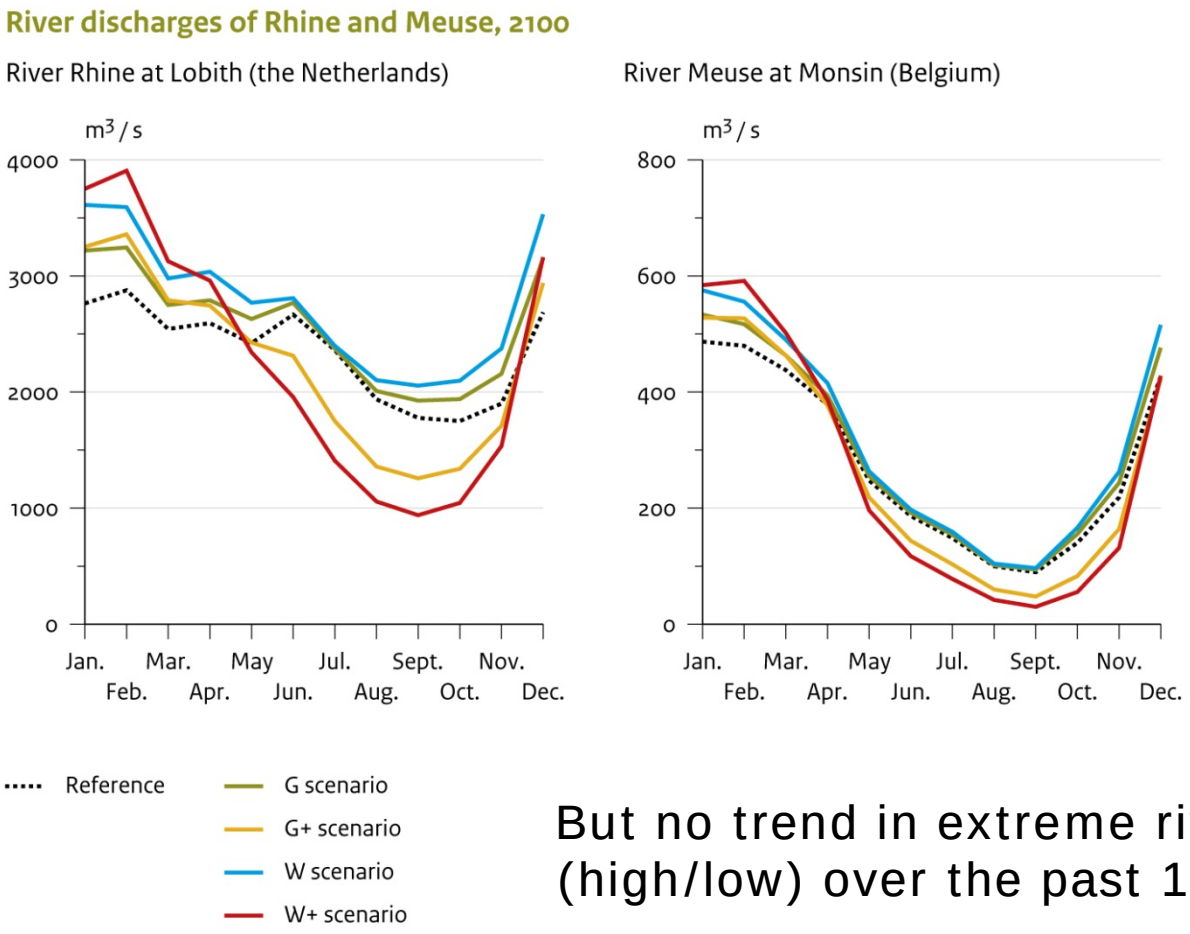
Uncertainty: sealevel rise

Sea level rise



No accelleration of SLR measured yet

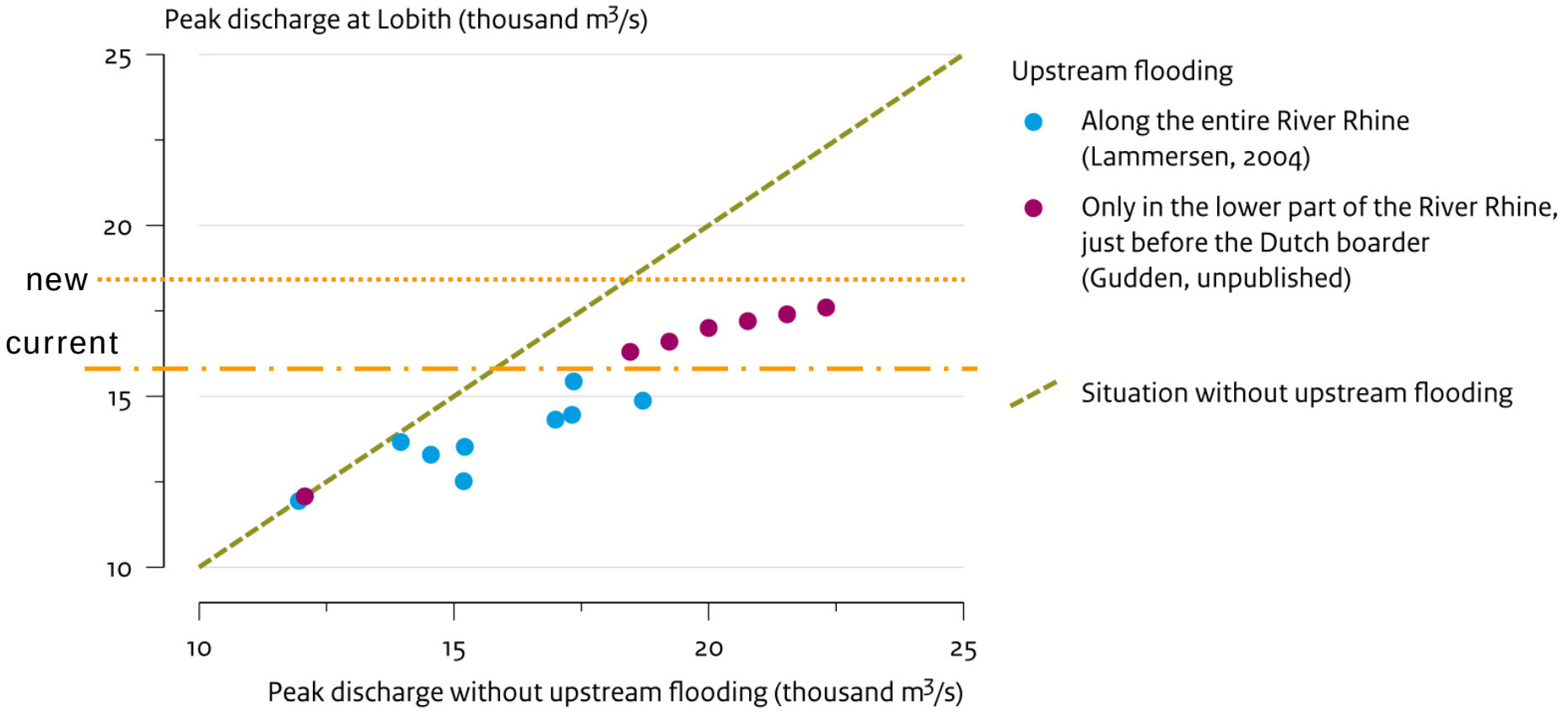
Uncertainty: river discharges



But no trend in extreme river discharges (high/low) over the past 100 years!

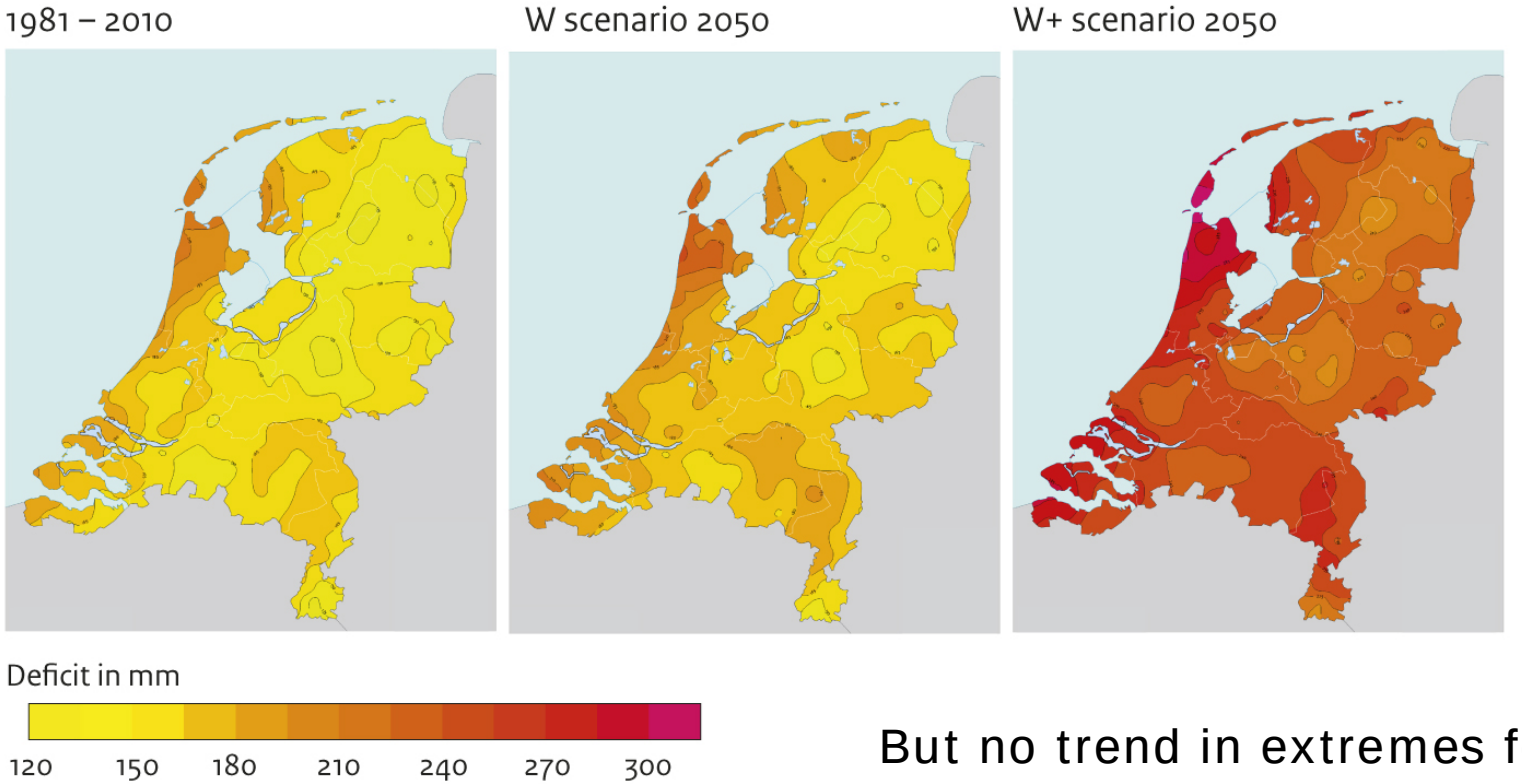
Additional uncertainty: upstream river policy

Impacts of upstream flooding in Germany on peak discharges at Lobith (the Netherlands)



Uncertainty: precipitation deficit

Maximum precipitation deficit per year

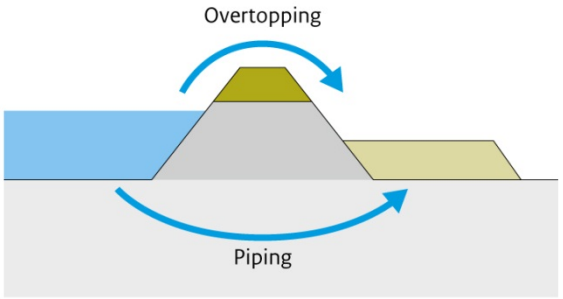


But no trend in extremes found yet!

I Flood protection

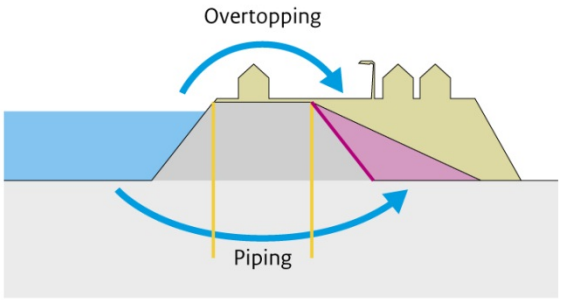
Options for dyke reinforcements

Conventional dykes



Options:
- Raising of the dyke
- Stability shoulder

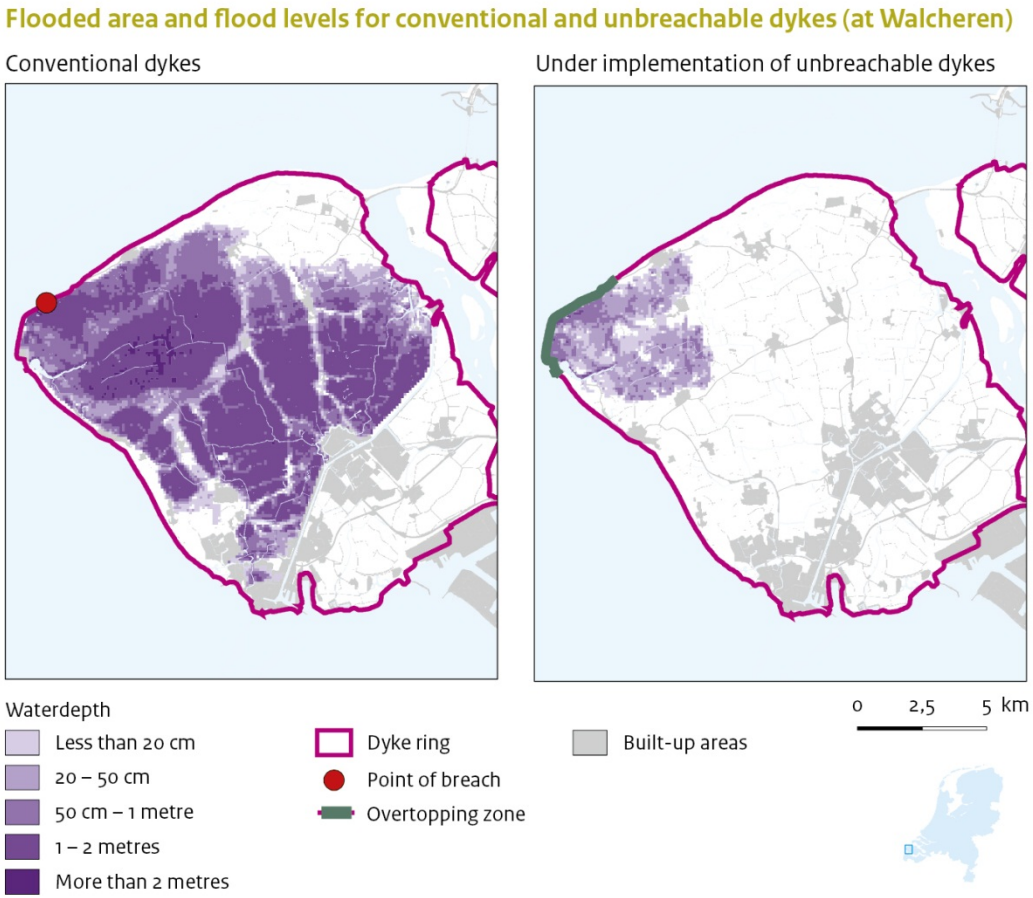
Unbreachable dykes



Options:
- Broadened dyke, combining functions (housing)
- Sheet piling
- Reinforcement of inner slope
- (More) gentle inner slope

Delta dyke:
new element to be considered in flood protection strategy

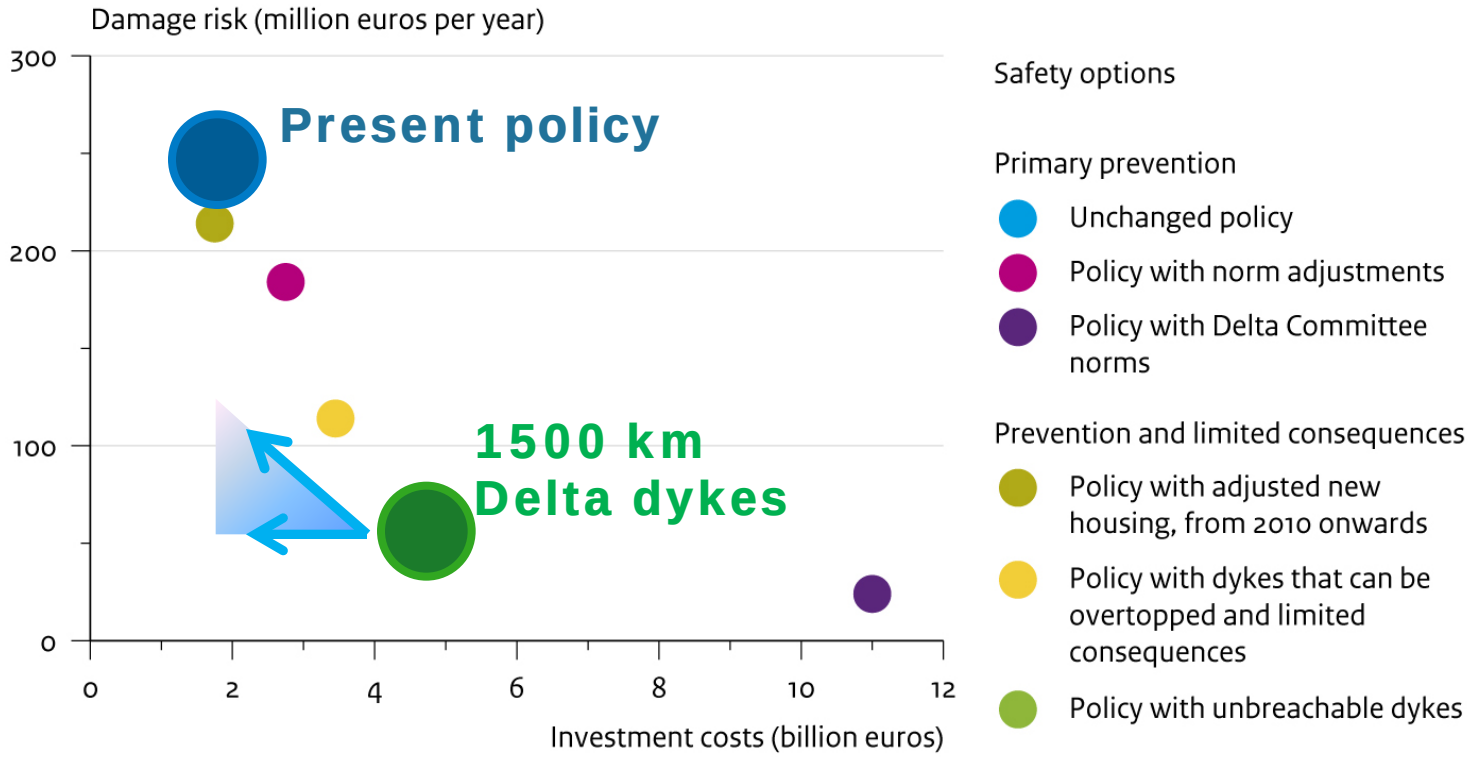
Possible effect of Delta dykes



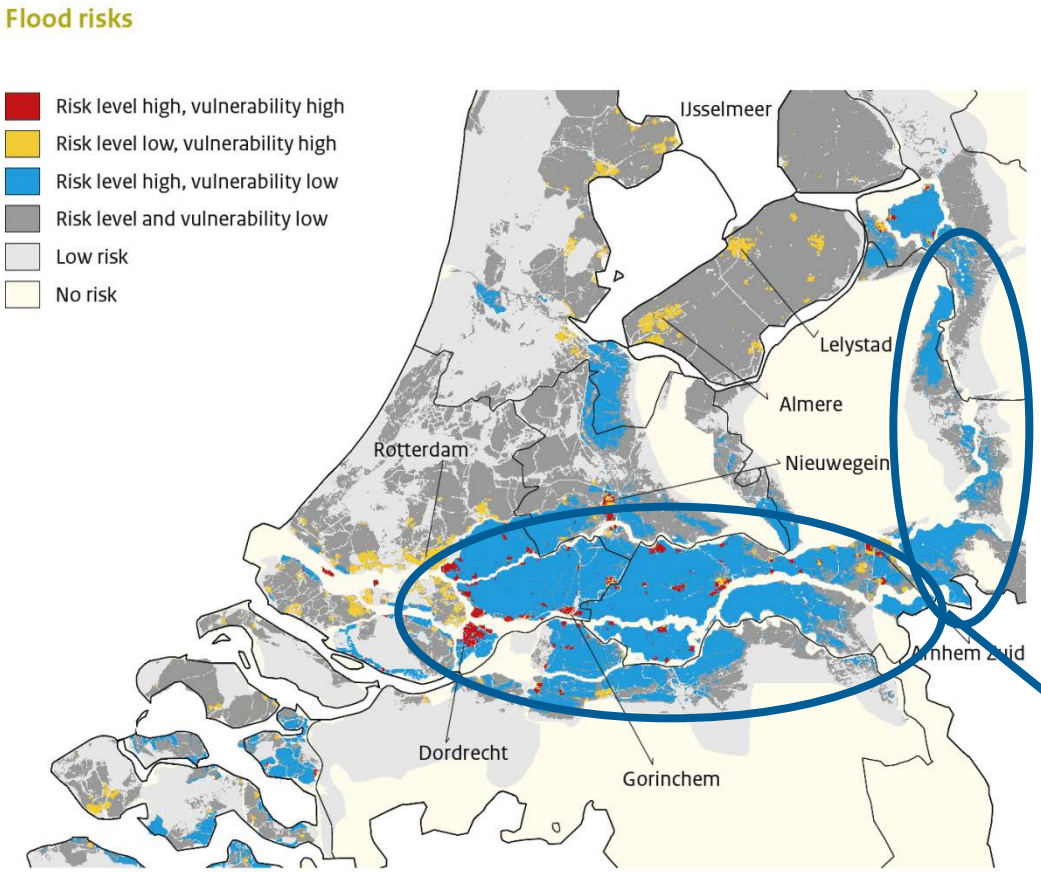
- Strong decrease in casualties (50-80%)
- Strong reduction in economic losses
- Efforts for adjusting built-up area reduced
- Less vulnerable to unexpected extremes caused by climate change

Disadvantage: Delta dykes more costly

Indication of investment costs and damage risk related to flooding, 2020 – 2050



Effective solution: Application only at hot spots

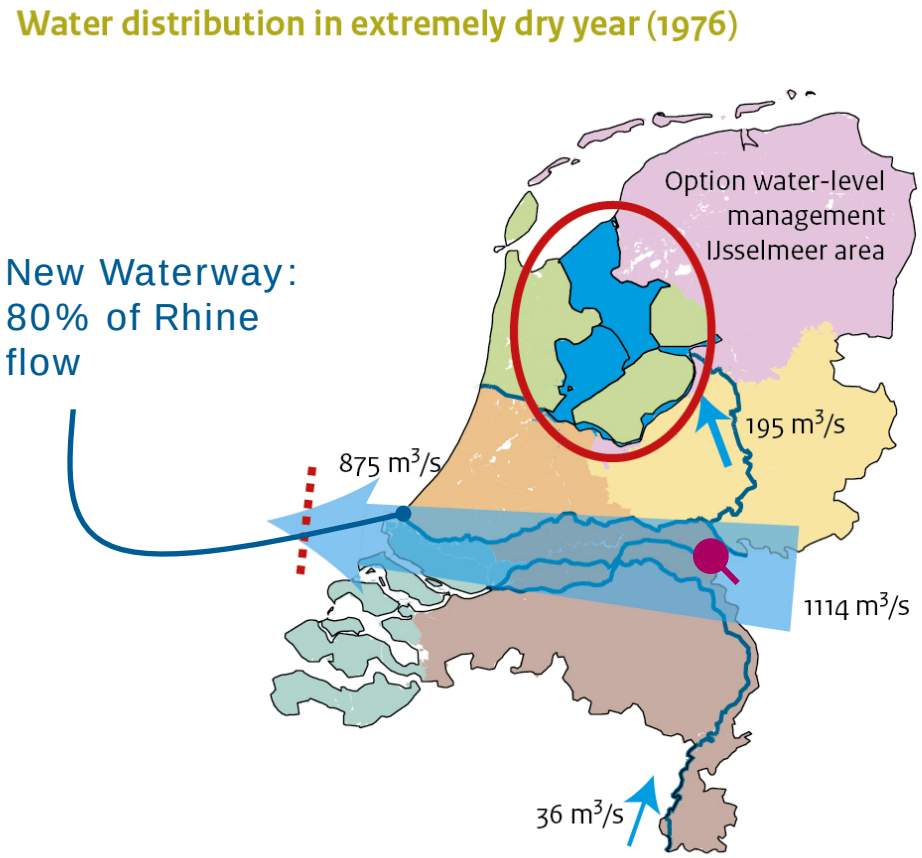


- Lower investment costs by
  - Selective use at hot spots. 200 km Delta dyke reduces flood risks by 50%
  - Multifunctional design and shared costs

In addition:

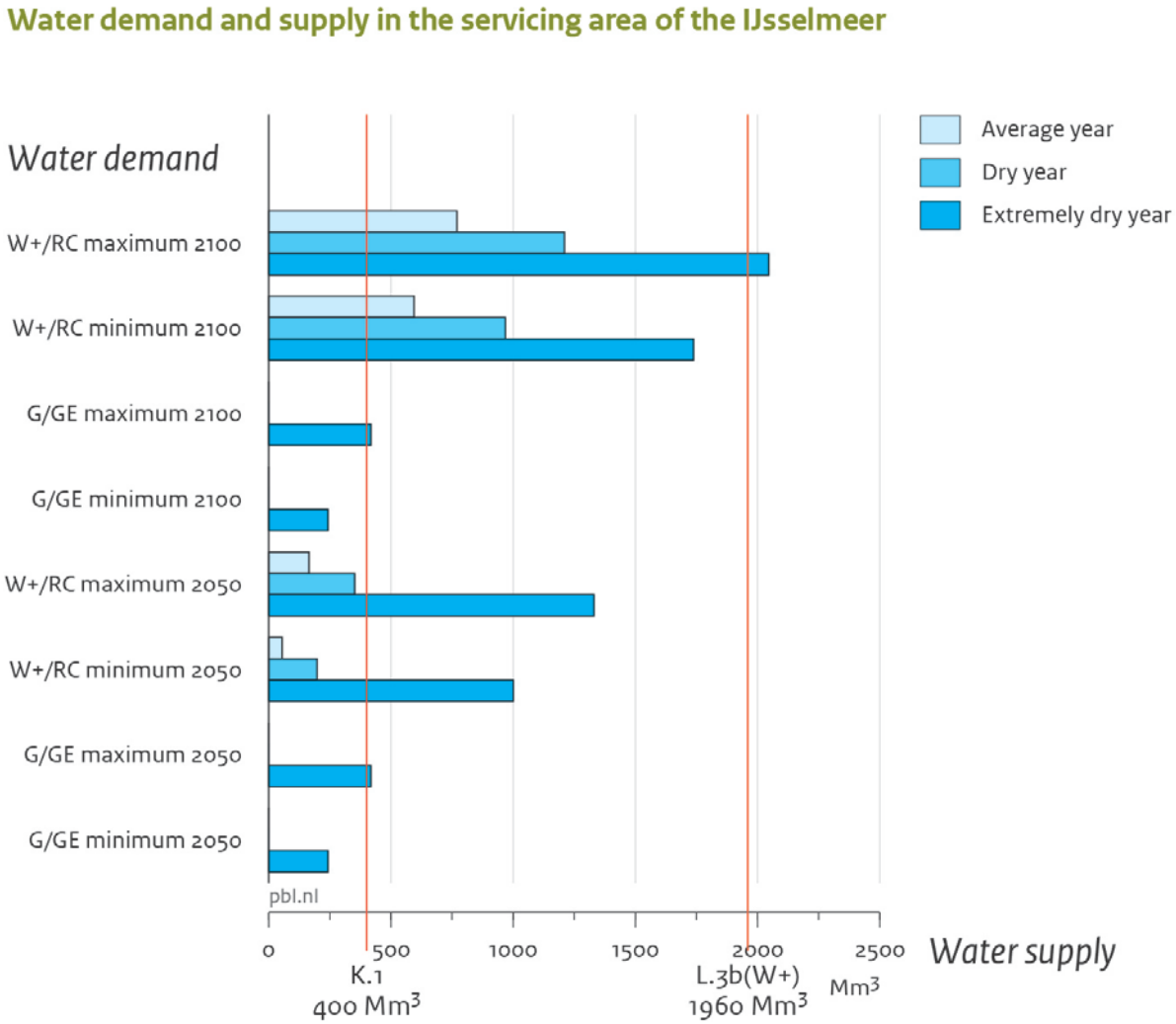
- Reserve water retention areas in flood plains

Options for increasing freshwater supply



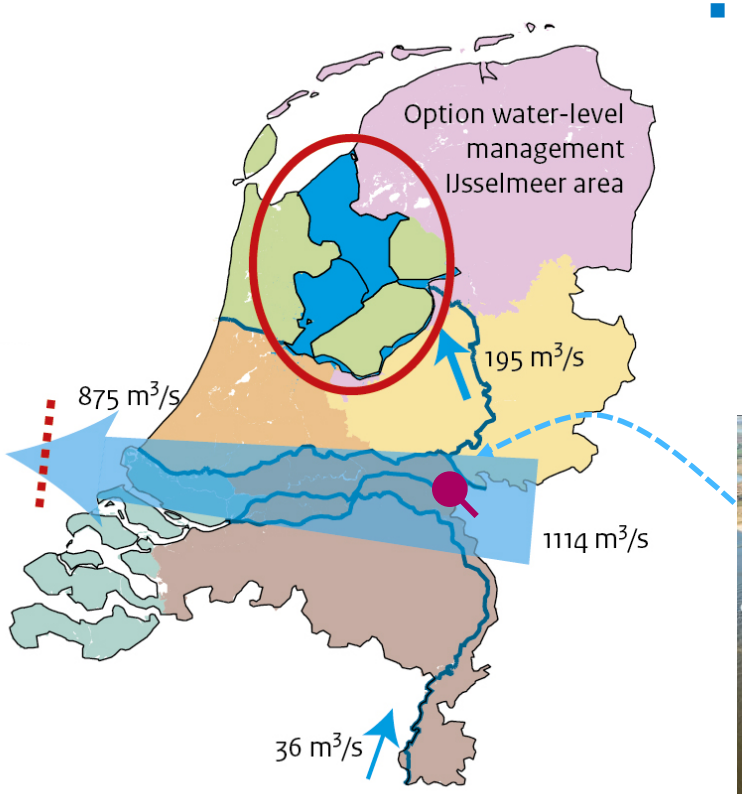
- Due to 2nd Delta Committee strong focus on IJsselmeer (water level + 1.5 meter)
- PBL: Focus on better use of Rhine water.
- 10% of Rhine at New Waterway ≈ 1 meter water-level fluctuation in IJsselmeer

Matching demand & supply: need for strong rise of water level in the IJsselmeer?



Flexibility in freshwater supply

Water distribution in extremely dry year (1976)



- Small water level fluctuation in IJsselmeer
- Explore costs & benefits of options for better use of Rhine flow:
  - more effective options preventing sea intrusion?
  - flexibility in managing river discharges?

Was our assessment used?

Yes!

- Reference to PBL 2011 under heading "Relevent developments" in publication of Delta Programme 2011

- In Delta Programme 2011 as well:
  * extra attention for Delta dykes
  * only restricted fluctuation of water level in IJsselmeer (decission)
  * New Waterway as new option for freshwater strategy

- Follow-up requests for:
  * contribution to development of Deltascenarios
  * explore flood protection strategies
  * integrated long-term assessment for Southwestern Delta

- Enthousiastic reactions from water boards and provinces ("happy with new and different views", "refreshing discussions within Delta Programme")

Relevant PBL assessments

- Flood protection in the Netherlands: framing long-term challenges and options for a climate resilient delta (2009)
- Roadmap to a climate-proof Netherlands (2009)
- Climate adaptation in the Dutch delta – Strategic options for a climate-proof development of the Netherlands (2011)
- Effects of climate change in the Netherlands – update 2012 (2012)
- A statistical study of weather-related disasters. Past, present and future (2012)

http://www.pbl.nl/en/

Thank you!