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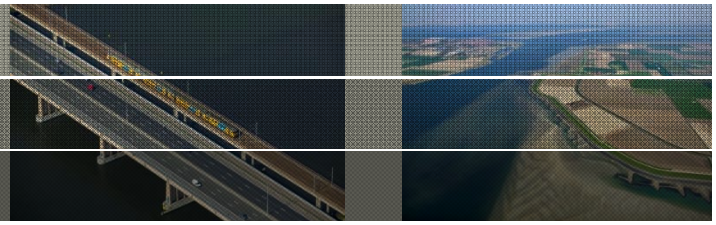
Enabling Delta Life

Adaptation Planning in the Transboundary Rhine River Delta and UN/ECE Pilot Projects

Cees van de Guchte
The Netherlands
UNFCCC, 18-20 July 2012, Mexico-City

The Netherlands



Setting:

Small country, Population 17 Million

Delta of 4 transboundary river basins

Rhine, Meuse, Scheldt, Eems

26% below sea level

60% susceptible to flooding

Flood-sensitive area is densely populated, generates 60% of GDP

High level of flood protection

Geography of the Netherlands focusing on the most important national waters

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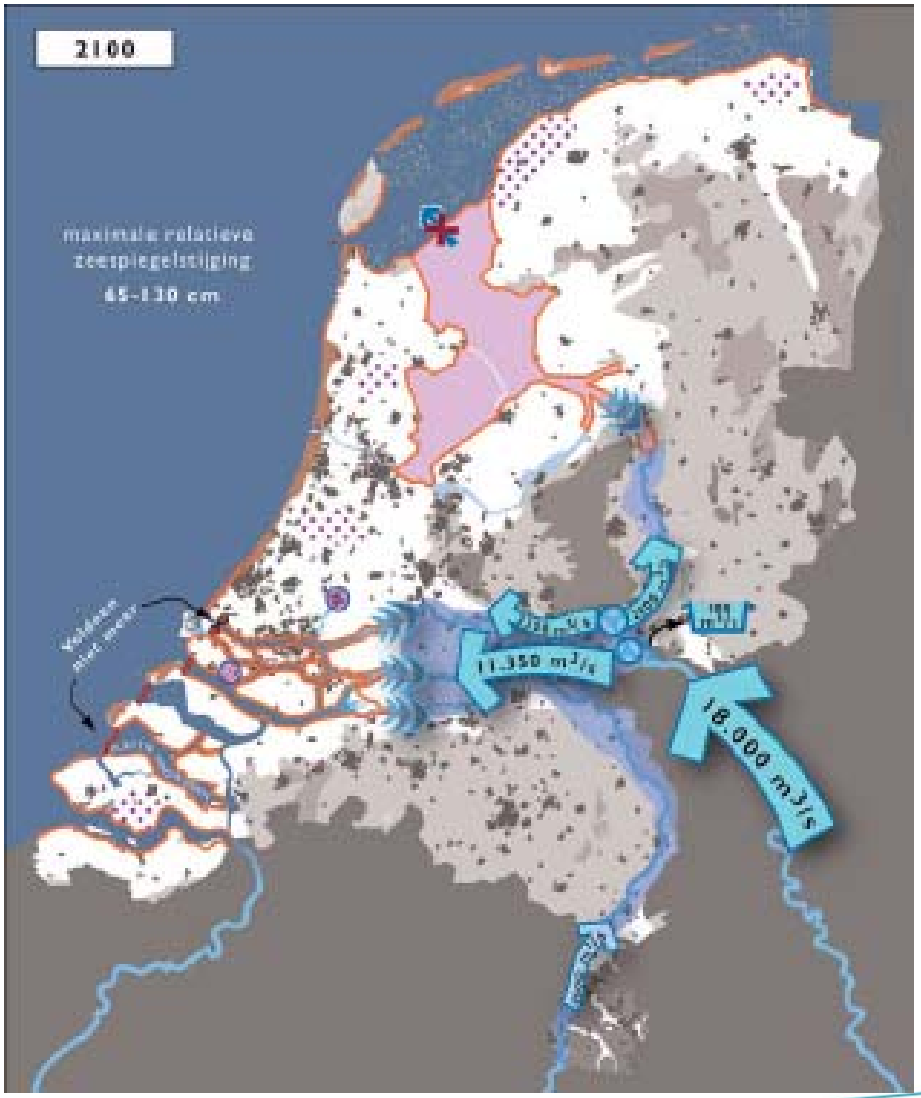
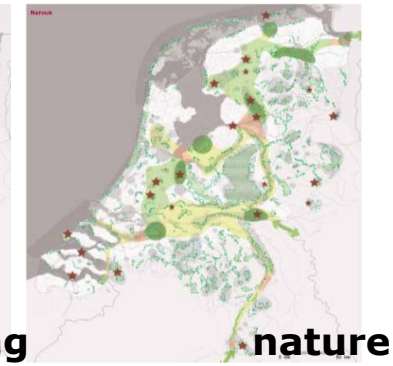
Changing boundary conditions > Delta scenarios



Living and working



nature

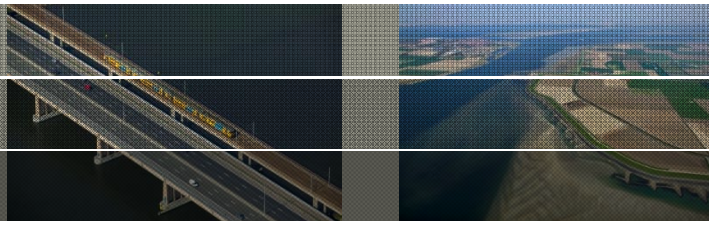
navigation

recreation

agriculture

energy

I: Flood Risk Management

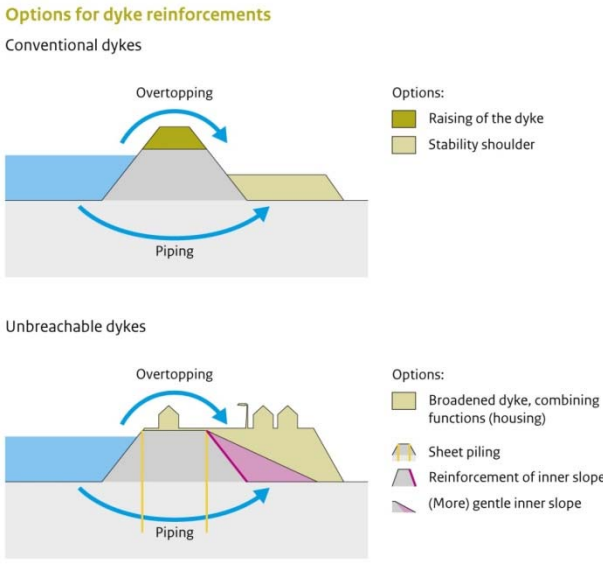


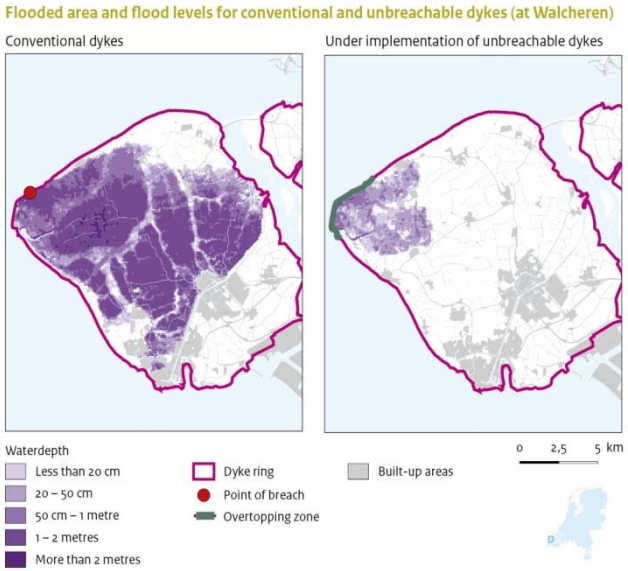
Problem: Rising sea level, increasing river discharges, subsidence
Hotspot: Rotterdam – The Hague area

Challenge: A safer and less vulnerable Netherlands, and safe to invest in!

Risk = probability x effect (present policies focus on probability)

Response: more attention needed for 'reducing the effects', through spatial planning and development (long term processes), and the implementation of delta dykes (= unbreachable)





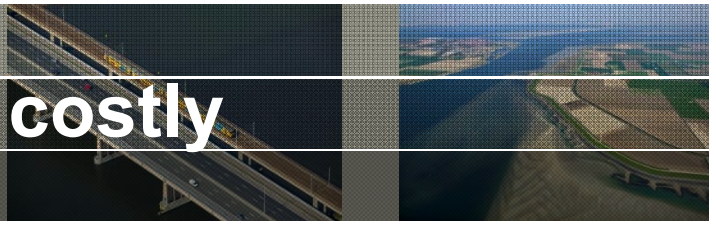
Strong decrease in casualties (50-80%)

Strong reduction in economic losses

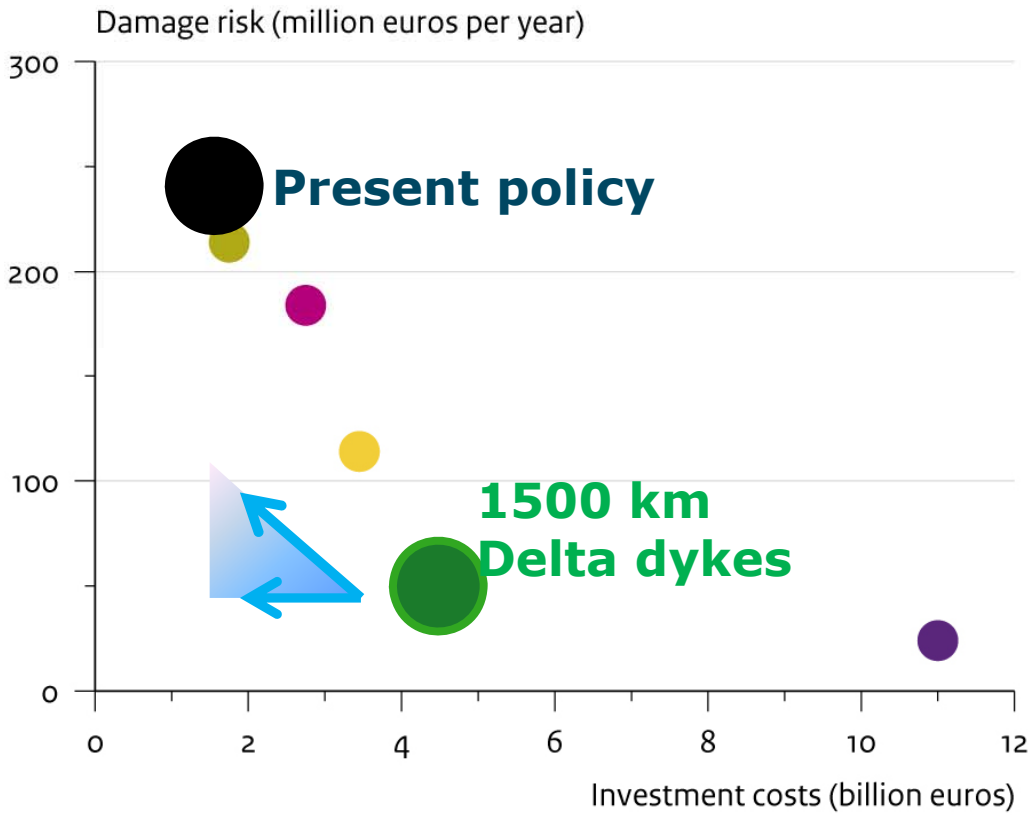
Efforts for adjusting built-up area reduced

Less vulnerable to unexpected extremes caused by climate change

Disadvantage: Delta dykes are costly



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



Safety options

Primary prevention

- Unchanged policy
- Policy with norm adjustments
- Policy with Delta Committee norms

Prevention and limited consequences

- Policy with adjusted new housing, from 2010 onwards
- Policy with dykes that can be overtopped and limited consequences
- Policy with unbreachable dykes

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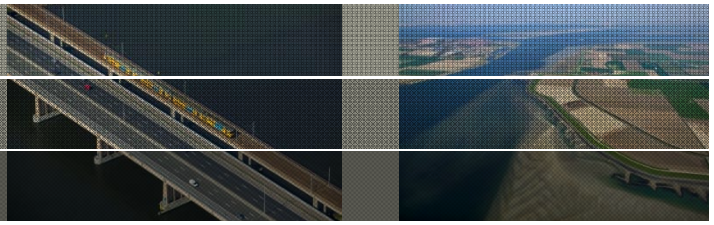
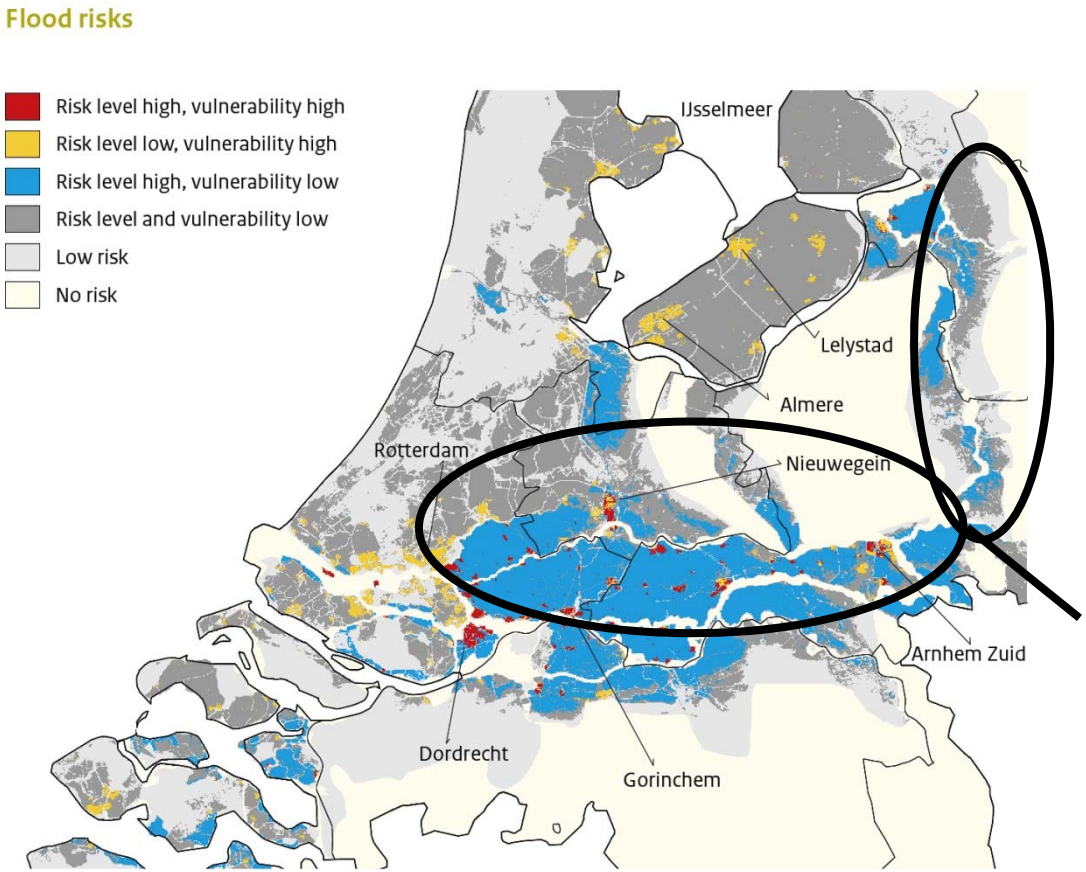
Effective approach:
Implementation at hot spots only





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:

- **Retain water in designated areas e.g. on flood plains**

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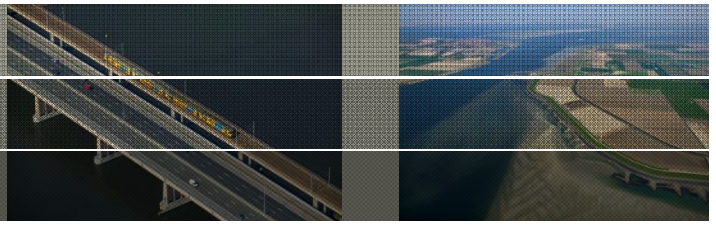
II: Freshwater availability
(ref. drinking water, agriculture, industry, and salinisation, shipping)



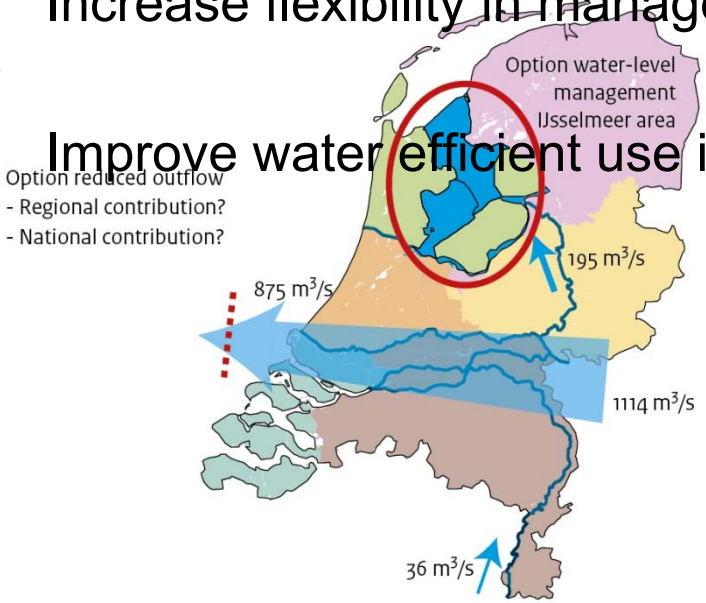
Problem: under most dry scenario a tipping point occurs near 2050 if water demand increases, even before 2050

Challenge: Enough fresh water in extremely dry summers

Response: Improve the balance between water supply ⇔ water demand

Increase flexibility in management and use of water systems

Improve water efficient use in b waters



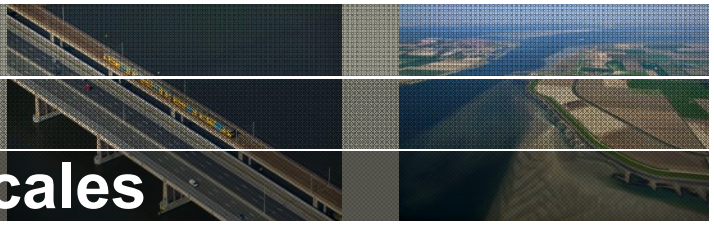
Central Lake IJsselmeer could serve as an extra buffer for freshwater storage

90 % of Rhine water is being used for preventing salt intrusion

Low discharge may impact ship transport and industrial cooling capacity

Biodiversity may be impacted, Agricultural practices may need to be adapted more rigorouslly

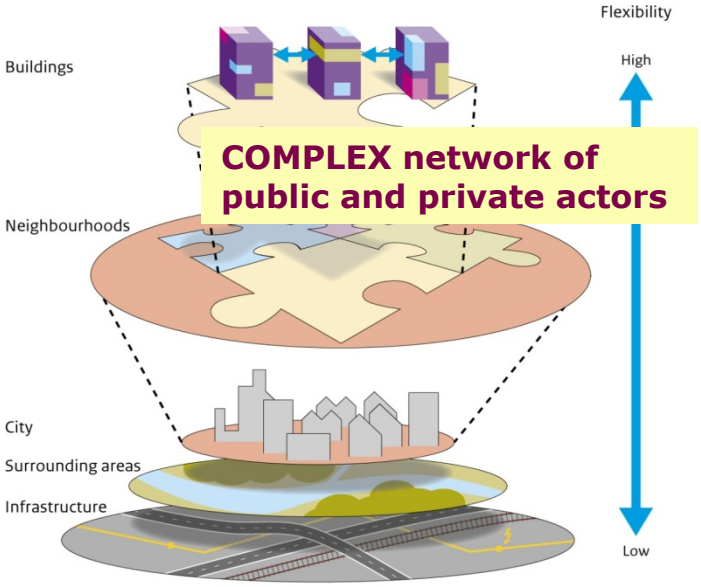
III: Urban areas
- actors and measures at various scales



Problem: Urban Flood Risks, increasing water nuisances, heat risks

Challenge: A climate-proof development of urban areas

Response: Knowledge, expertise and effective measures are available
Flexibility in urban infrastructure should be enhanced
Integration of adaptation measures in new urban development, redevelopment or maintainance programme today is needed to reduce additional costs in the future



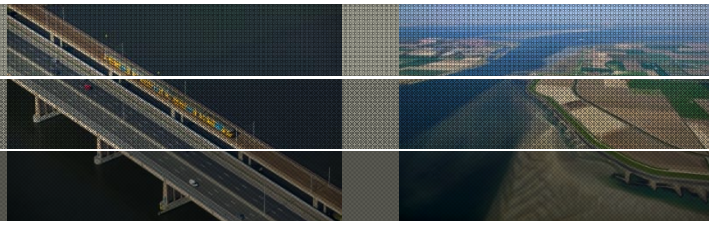
Potential measures:

Use of buildings, Insulation of buildings, Adjust treshold height, Water retention in streets, Street vegetation, …,

Water retention under streets, Upgrade sewerage system, Create ponds and parcs, Thermal storage systems, …,

Green networks, Blue networks

Summarizing Statements



Unbreachable dykes and managing new development in the Rhine-Meuse floodplain will make the Netherlands safer and more climate-resilient.

Climate-proofing freshwater supply will require a more flexible water system and a better use of the water in the river Rhine.

Implementation of climate-proof measures in urban development requires urgent integration in planning and decision making and flexibility in financing mechanisms.

Climate adaptation is all about governance & policy development, adaptive management and associated costs, and securing an enabling environment for an uncertain future

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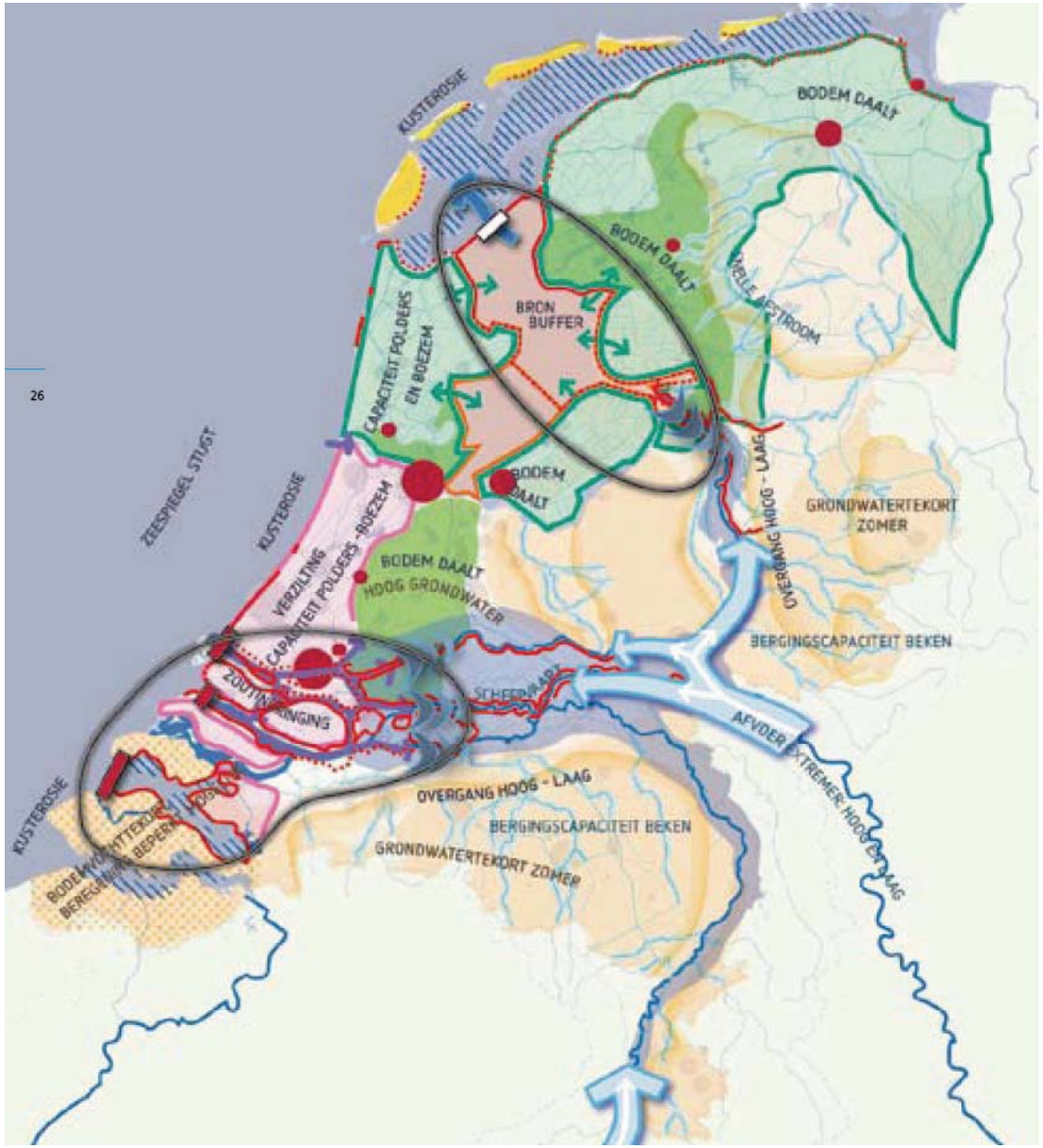
Preparing NL for Climate Change Impacts
>> Delta Programme II, some transboundary aspects



Kaart 3

Belangrijkste wateropgaven

- grote meervoudige opgave met regio-overstijgende invloed
- waterkwaliteit en zoetwateraanvoer onder druk
- wateraanvoer vanuit IJsselmeer onder druk
- zouttong schuift op, innamepunten onder druk
- potentieel bodemvochttekort
- aandacht voor peilbeheer en kwaliteit IJsselmeergebied
- gebied met bodemdaling
- stad in gebied met sterke bodemdaling
- toename extreem hoge rivierafvoer
- lagere gemiddelde zomerafvoer rivieren en vaker extreem laag
- overgangsgebied hoog - laag gevoelig voor wateroverlast
- periodieke wateroverlast beekdalen
- schorren en platen kunnen verdrinken bij zeespiegelstijging
- aandacht voor hoogte en stabiliteit waterkeringen (periode 2008-2050)
- aandacht voor hoogte en stabiliteit waterkeringen (periode 2050-2100)
- spuicapaciteit IJsselmeer onder druk bij zeespiegelstijging
- invloedsgebied zee/IJsselmeer verschuift rivieropwaarts als zeespiegel stijgt

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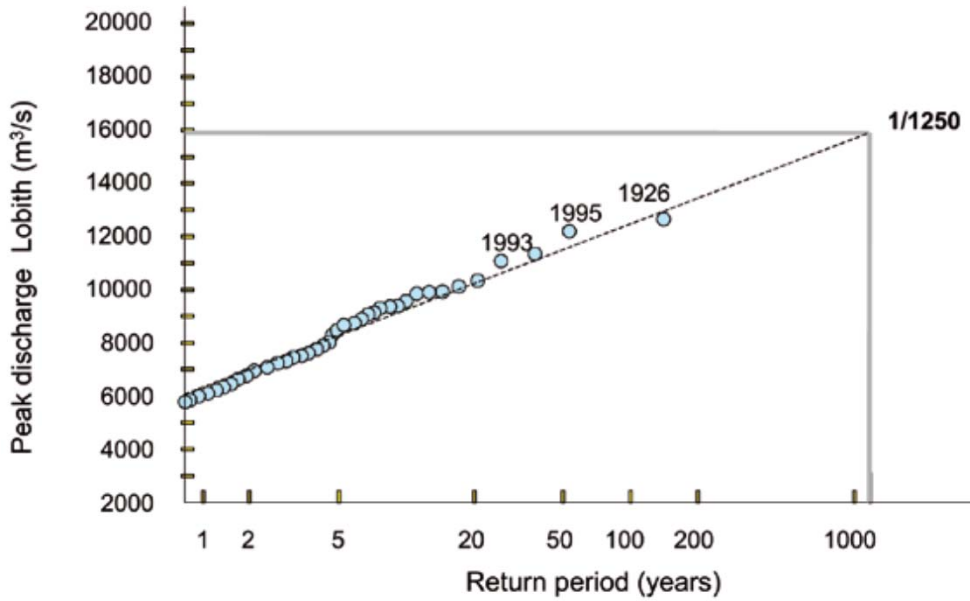
Standard design discharge estimation for the Rhine by Frequency Analysis using discharge records 1901-2004



Recurrence time	1.250
Pearson-III	14.954
Log-normal	14.842
Gumbel; Q0=7000	16.609
Exponentieel	16.964
Pareto	15.746

Central estimate discharge	15.680
95% low	13.060
95% high	18.370

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Additional info through hydrological modeling and a discharge generator, ensemble modeling jointly with neighbour countries

Recorded rainfall series

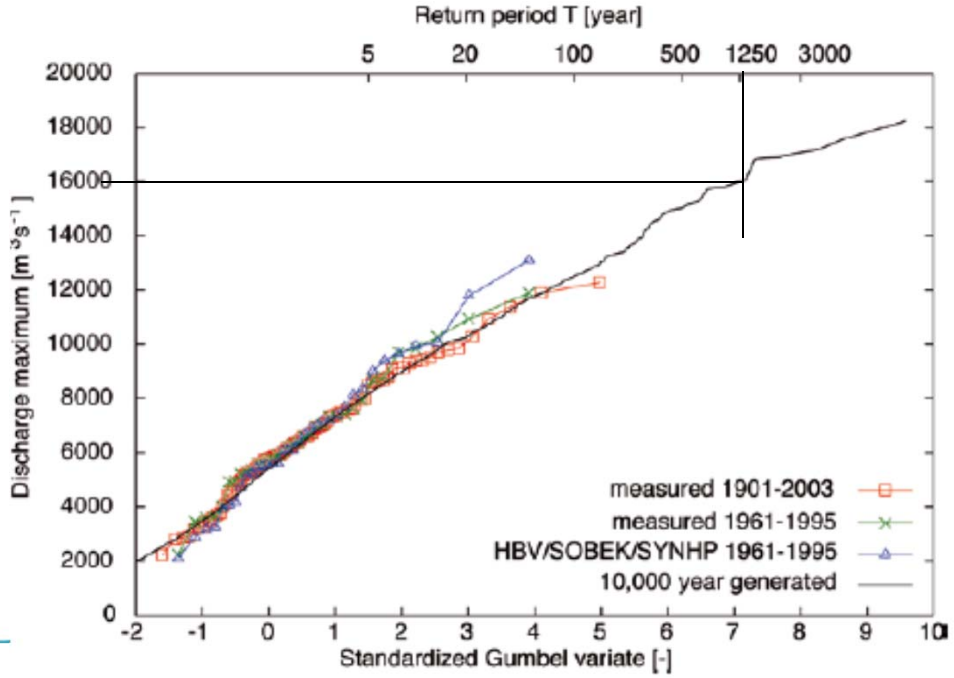
5	1	0	10	20	5	1	0	40	3

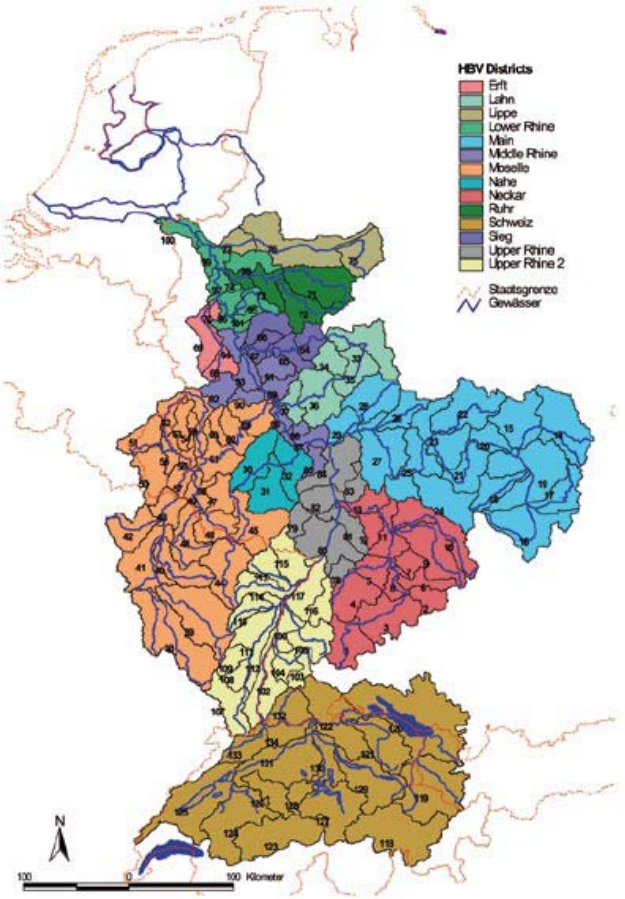
Largest 4-day amount: 46 mm

Rainfall series produced by resampling

0	5	1	10	40	10	20	0	0	0	...	

Largest 4-day amount: 80 mm





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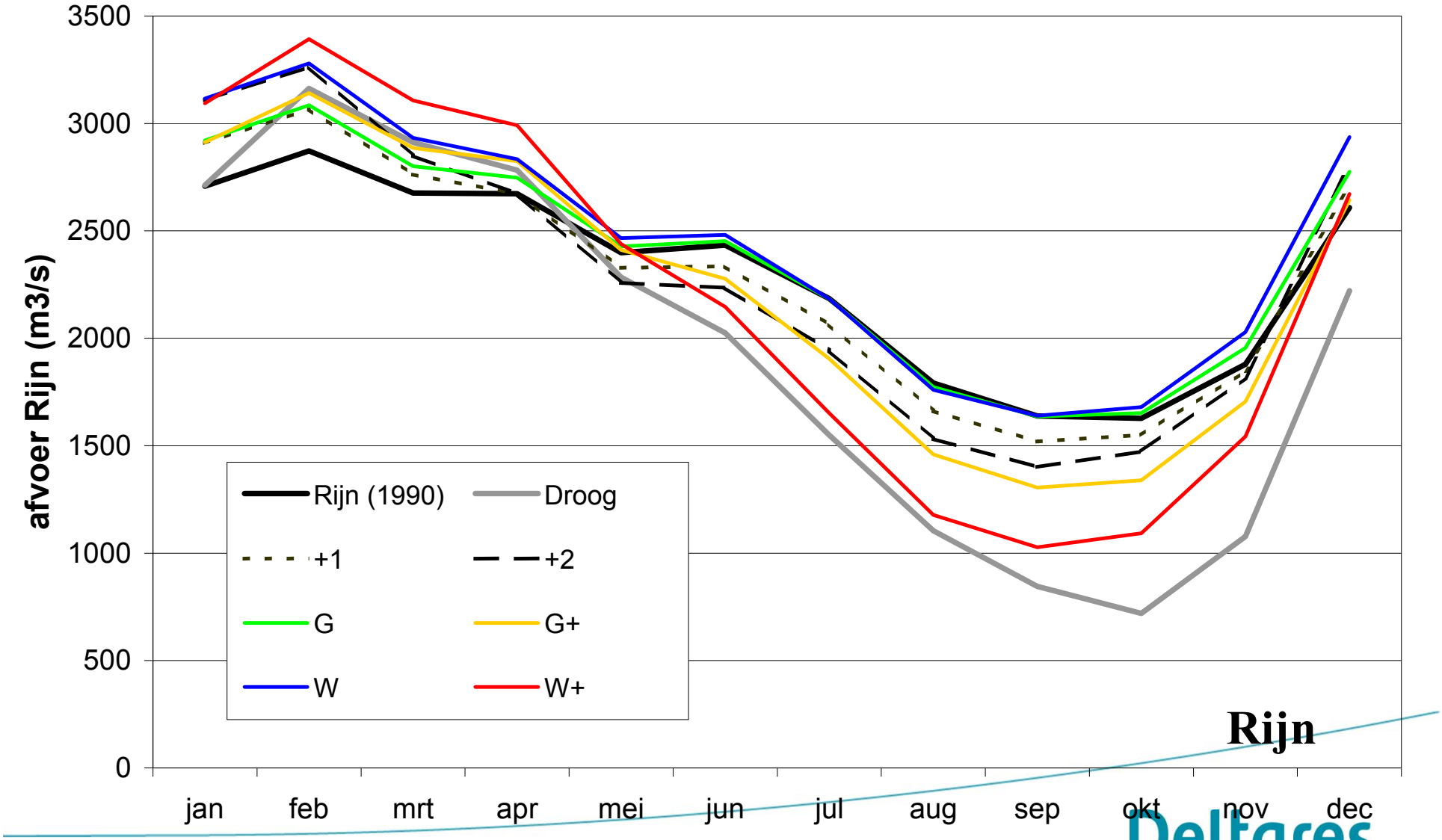
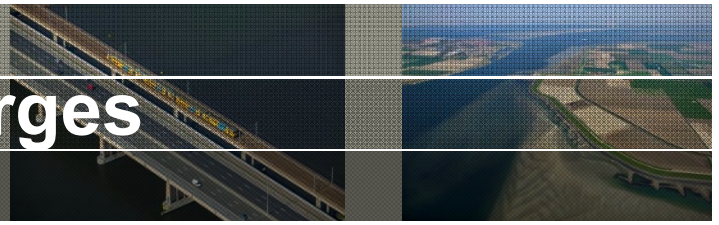
Future Rhine discharges acording to the KNMI Scenario's



Extrapolated to design discharges
(KNMI report ~2008)



	Reference value	2050	2100	2200
Peak discharge (m^3/s) Change in %	16000	16500 – 19000 3 – 19	17000 – 22000 6 – 38	n.a.

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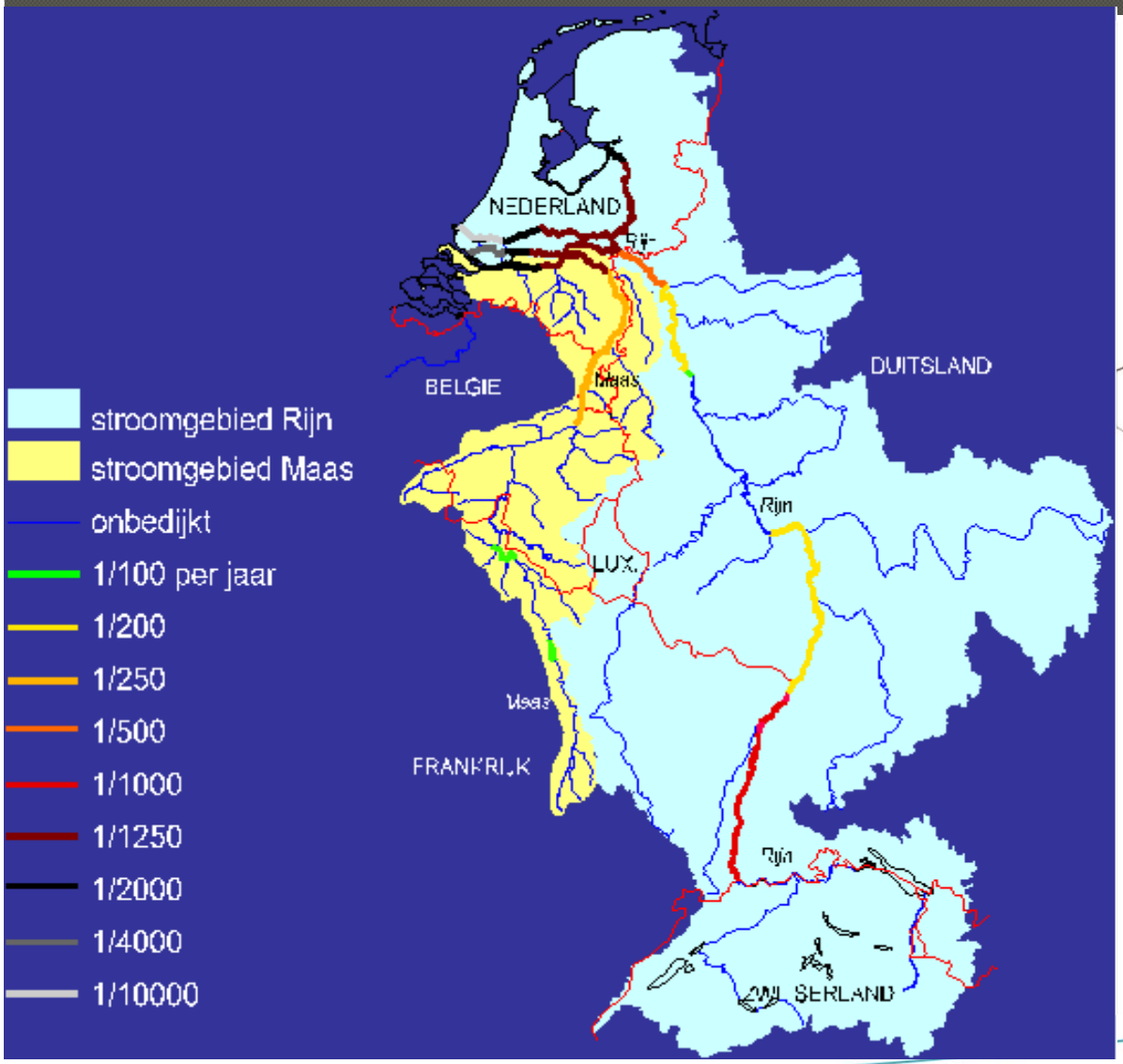
Regions where flooding may occur (Lammersen, 2008)



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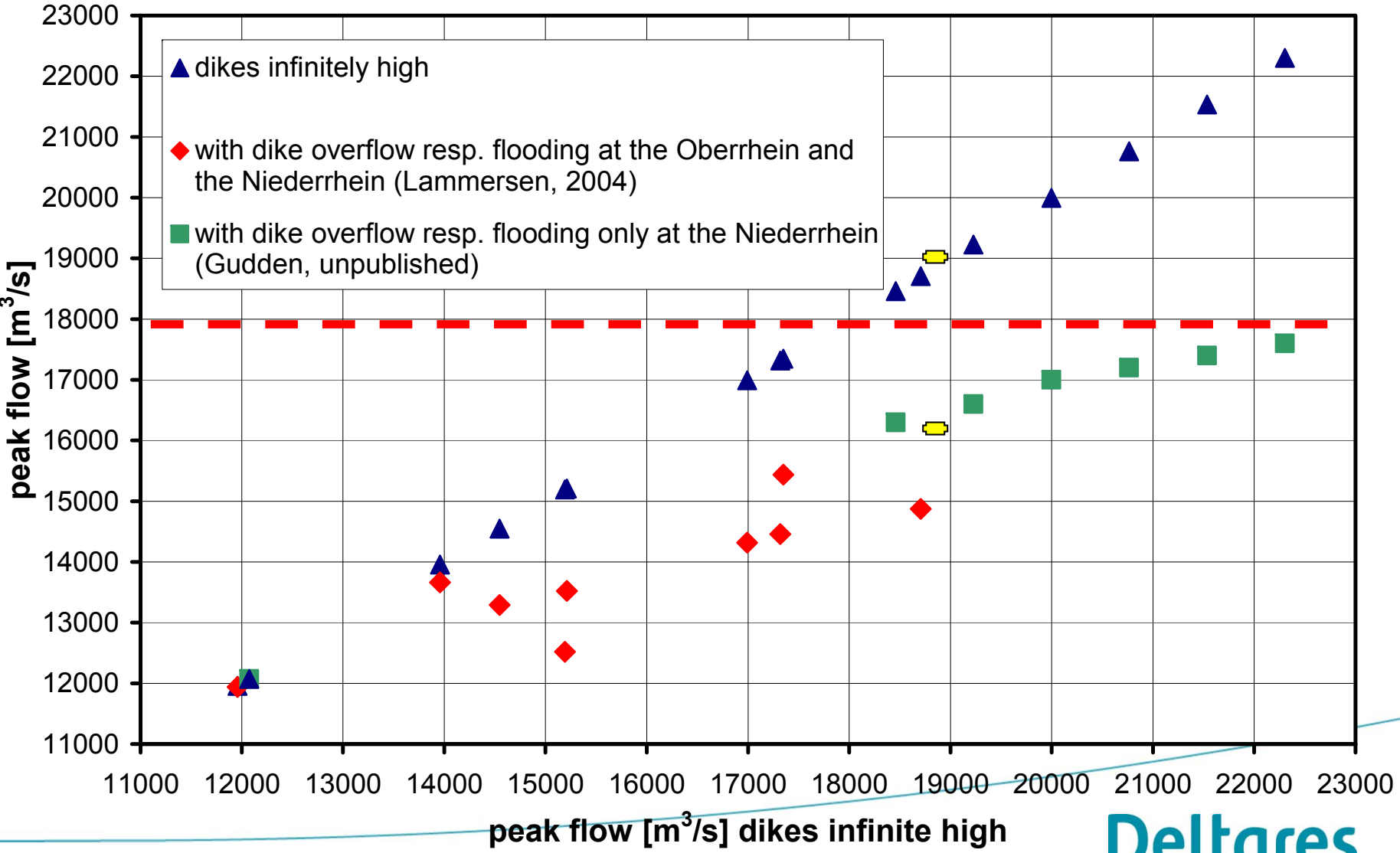
Effect of flooding in the Upper Rhine and Lower Rhine Valley in Germany



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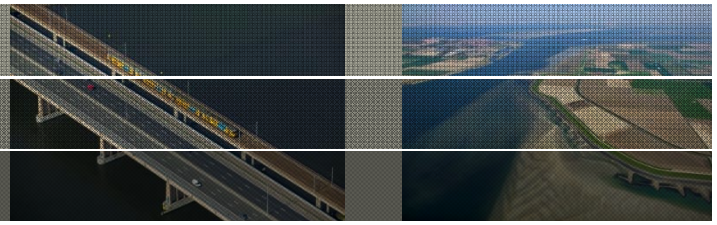
Conclusions



Changes in extreme discharges cannot be assessed from an envisaged climate change only.

Currently rare high discharge events will become normal events.

Under the current conditions the maximum Rhine discharge that can reach NL at Lobith is not > 17,500 m3/s, and probably much less.

Under the climate scenario's evaluated, flood protection measures in the lower Rhine in Germany may lead to more changes in the probability of the most extreme discharges (> 15,000 m3/s) than climatic change itself.

For the Netherlands, the relevance of joint transboundary analysis, the sharing of data, models and experiences, and a joint development of policies and measures to cope with high discharges is obvious.

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UN/ECE Guidance on water and adaptation to climate change

Developed in 2007-2009 by Task Force led by Netherlands and Germany

General roadmap towards adaptation of water management to climate change

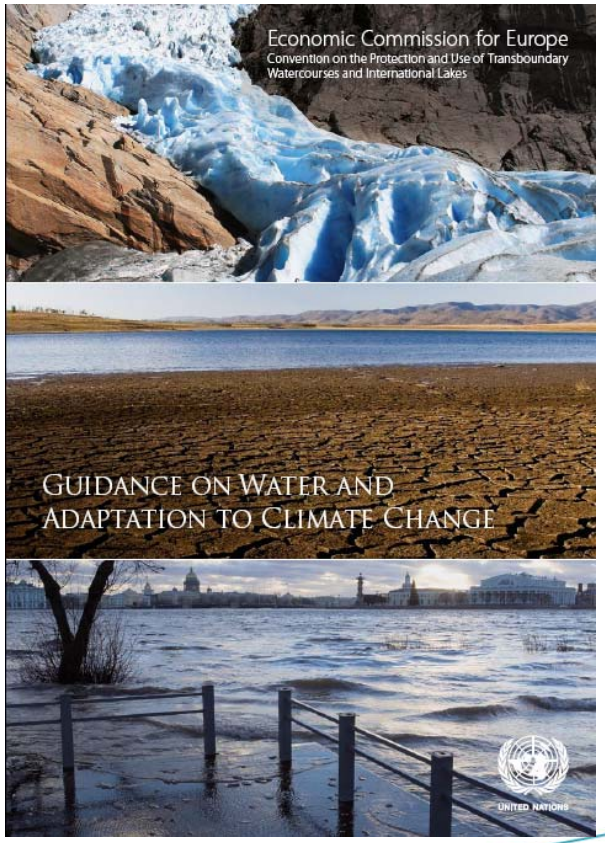
Guidance adopted in 2009, widely used

Enables effective and efficient transboundary adaptation through:

a wider knowledge base, and a larger planning space, so as to take measures in a basin where they have optimum effect

the possibility to share costs and benefits

=>Cooperation reduces uncertainty and costs!



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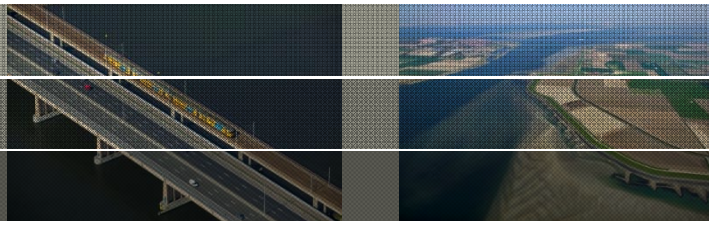
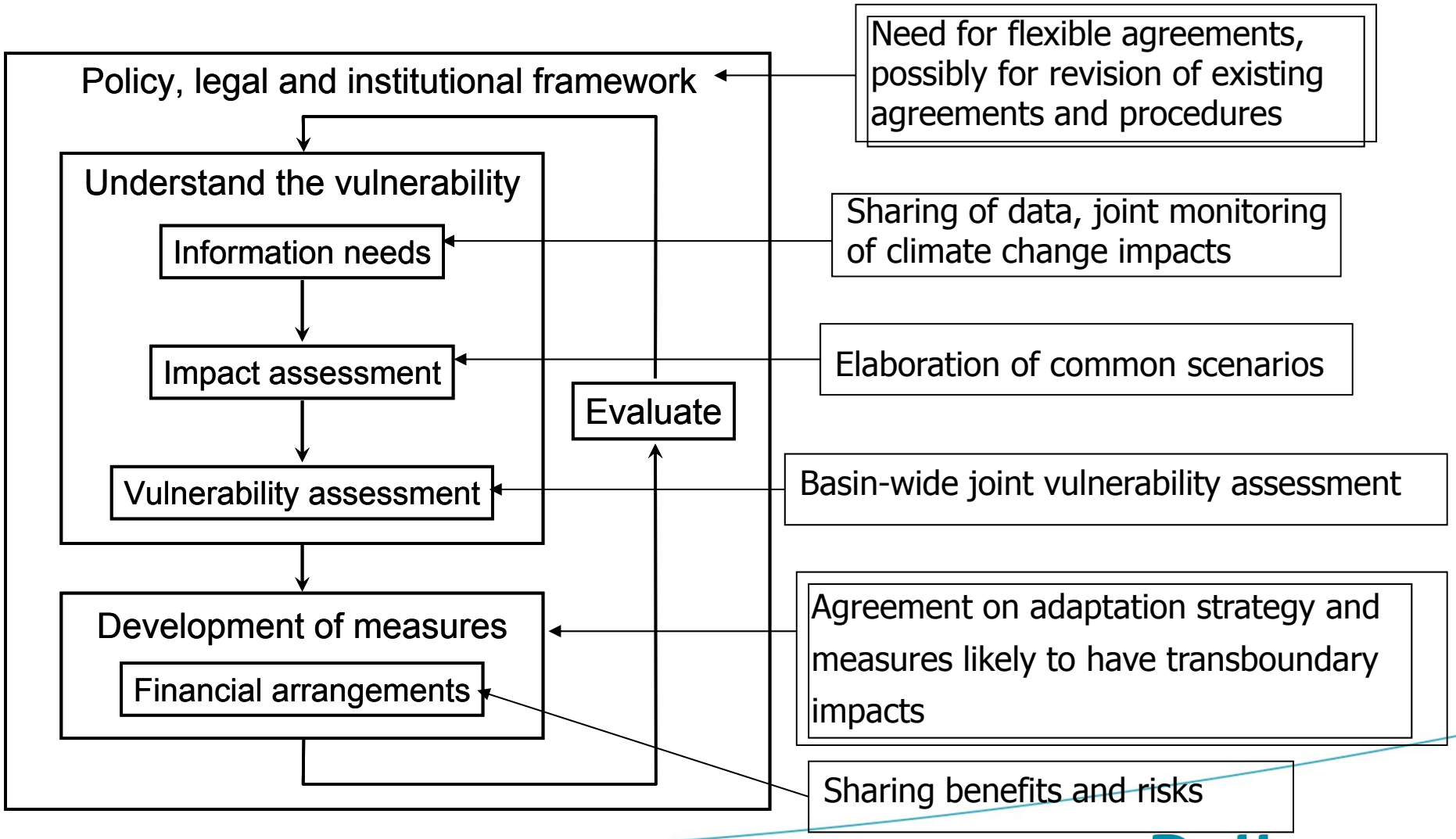
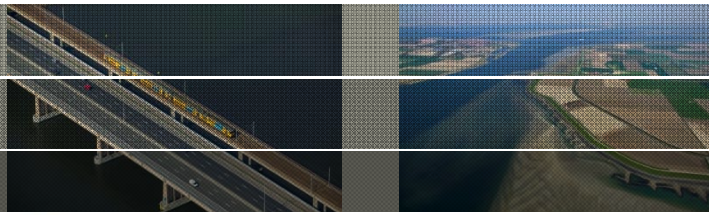
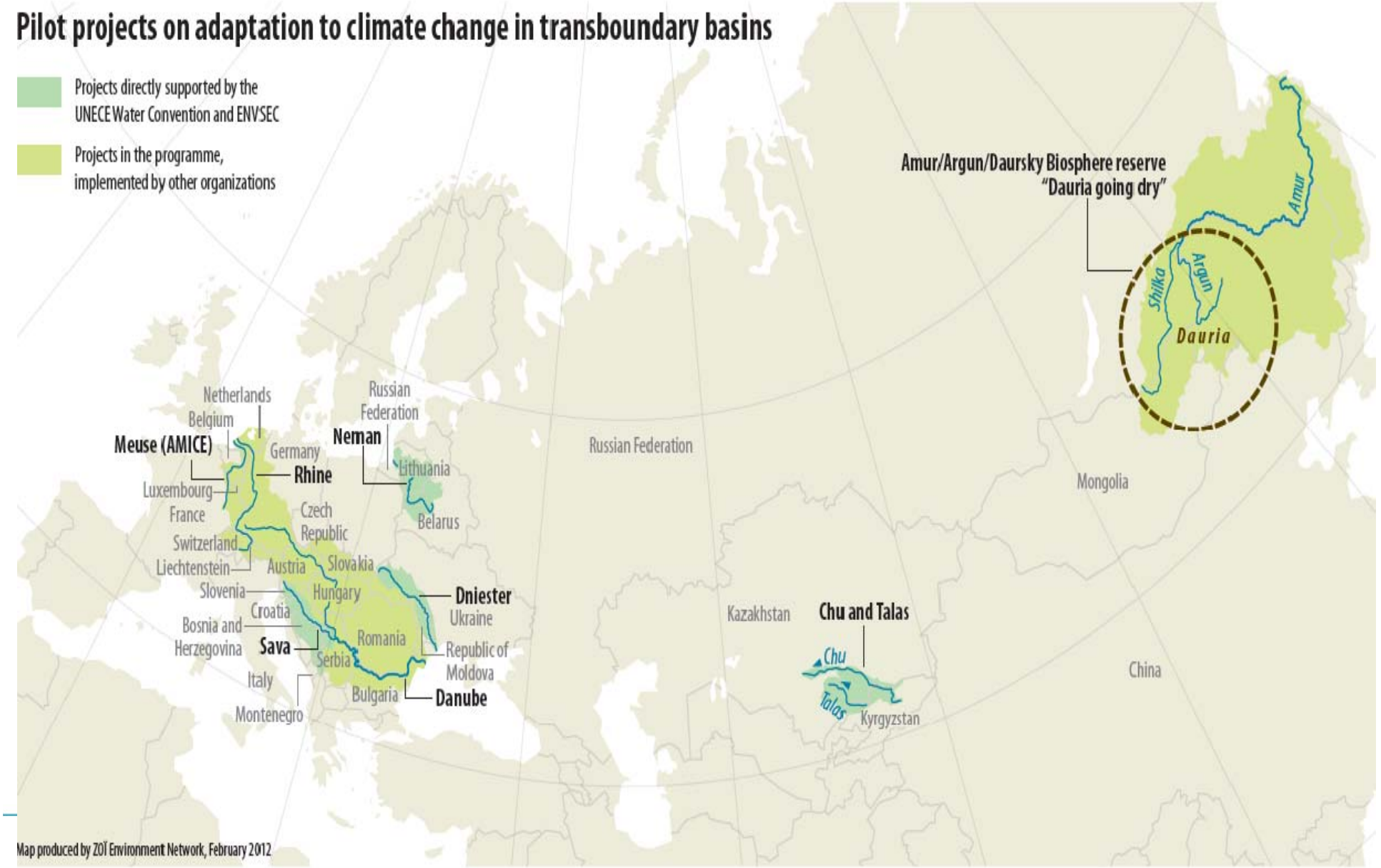
Cooperation needs in every step of developing an adaptation strategy



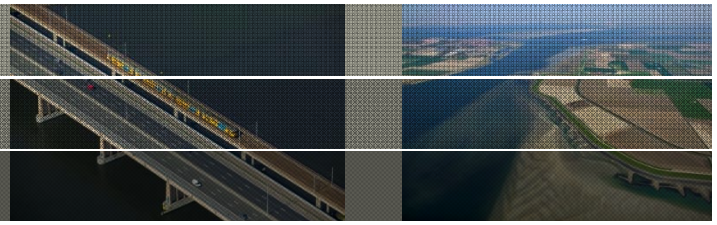


UN/ECE Pilot Projects





UNECE pilots: some first lessons learnt



In most basins climate change impact assessments had been done nationally, but using different methodologies >> importance of **joint scenarios, modelling and vulnerability assessment**, however, the extent of harmonization depends on resources and time available

Importance of **a thorough baseline study** to identify completed or ongoing projects and relevant partners to be involved

Importance of **the link between political and experts' level**, e.g. through creation of a joint working group and regular meetings

Institutional and cultural differences can be overcome through facilitated **focusing on common interests**, expert cooperation etc.

Importance of **concrete activities** and involving stakeholders & public

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For more information please contact:

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Towards a global platform to share experiences on climate change adaptation in transboundary basins