

Flood Protection and Planning in The Netherlands

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net risk work



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Room for the River

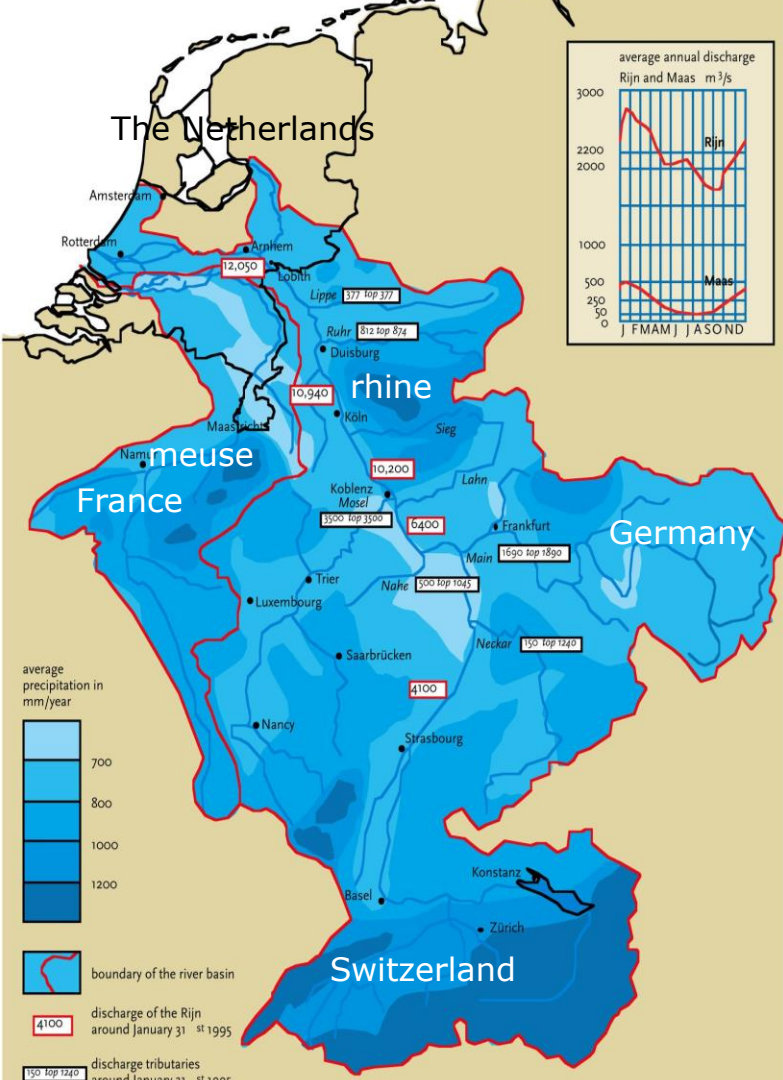


the Dutch Delta



north sea basin

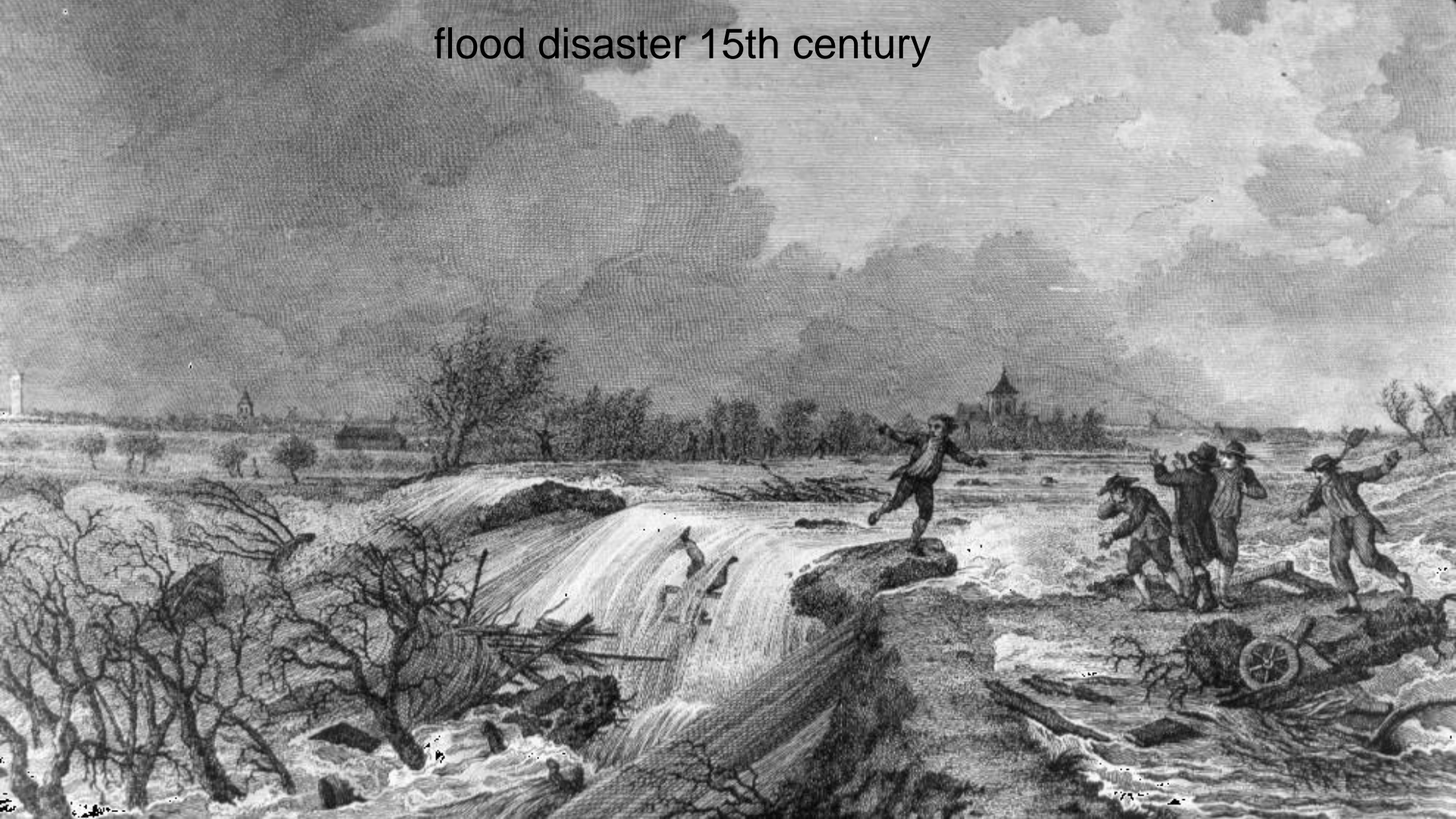
the Dutch Delta results from major European rivers



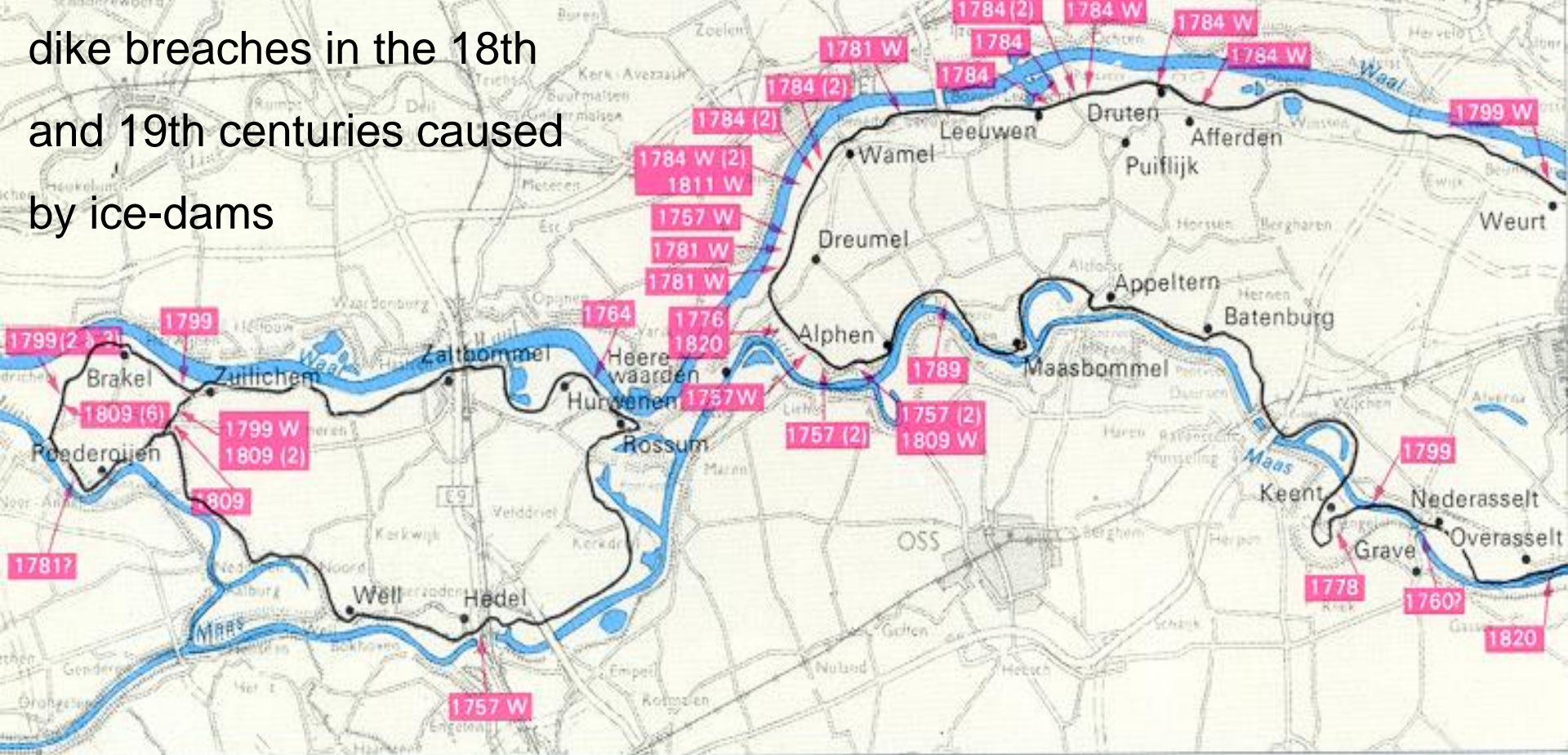
flood disasters



flood disaster 15th century

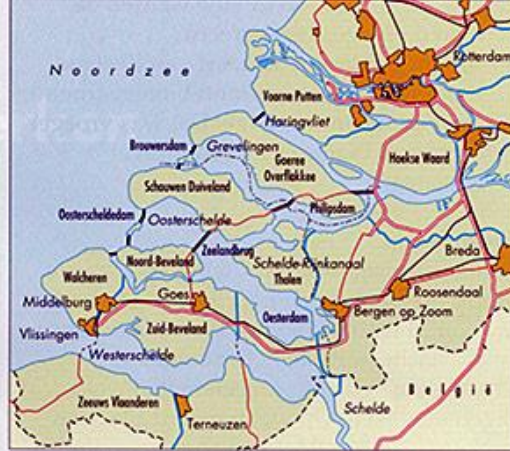


dike breaches in the 18th
and 19th centuries caused
by ice-dams



schaal 1:400 000

flood disaster 1953: the Delta Works



traditional flood protection policy

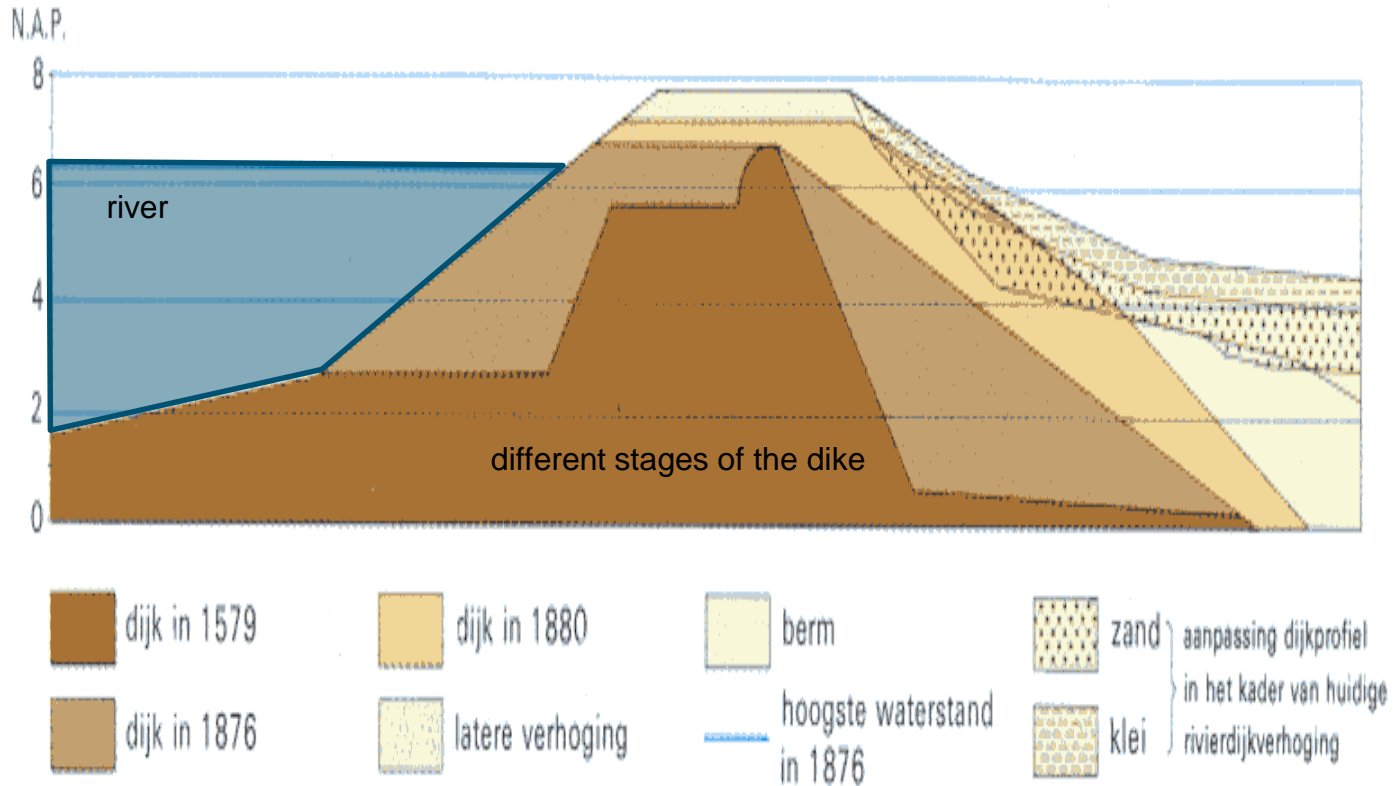


*De Vierde Plaatz van de overstromingen der Landen, inzonderheit het Land van Altena, en het Land van Housden, de
Eerichheid van Geertruydenberg, de gantsche Biesbos, die drey gabelven is, met alle classen d'overbraken
die drey gabelven is; met alle classen d'overbraken
Molens die gebruike is; om het water uit de
Stad te maalen in den Jaren 1740. en 1743.*



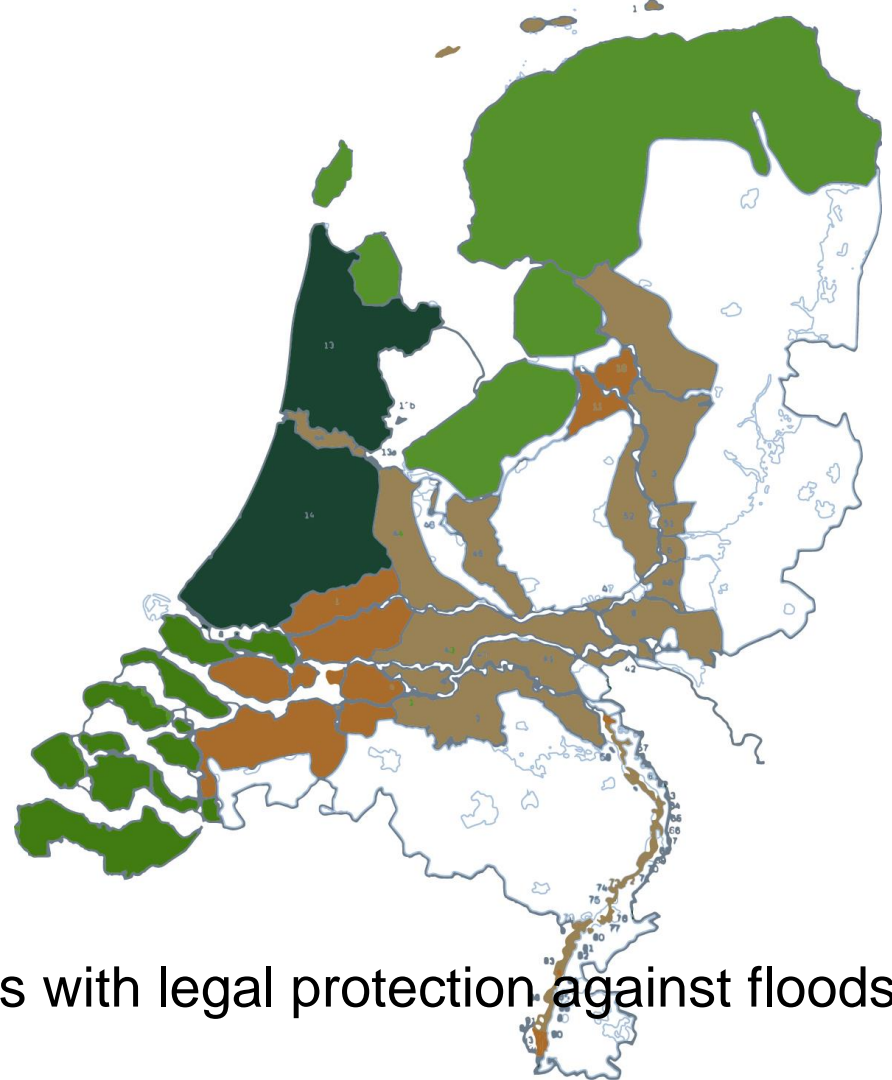
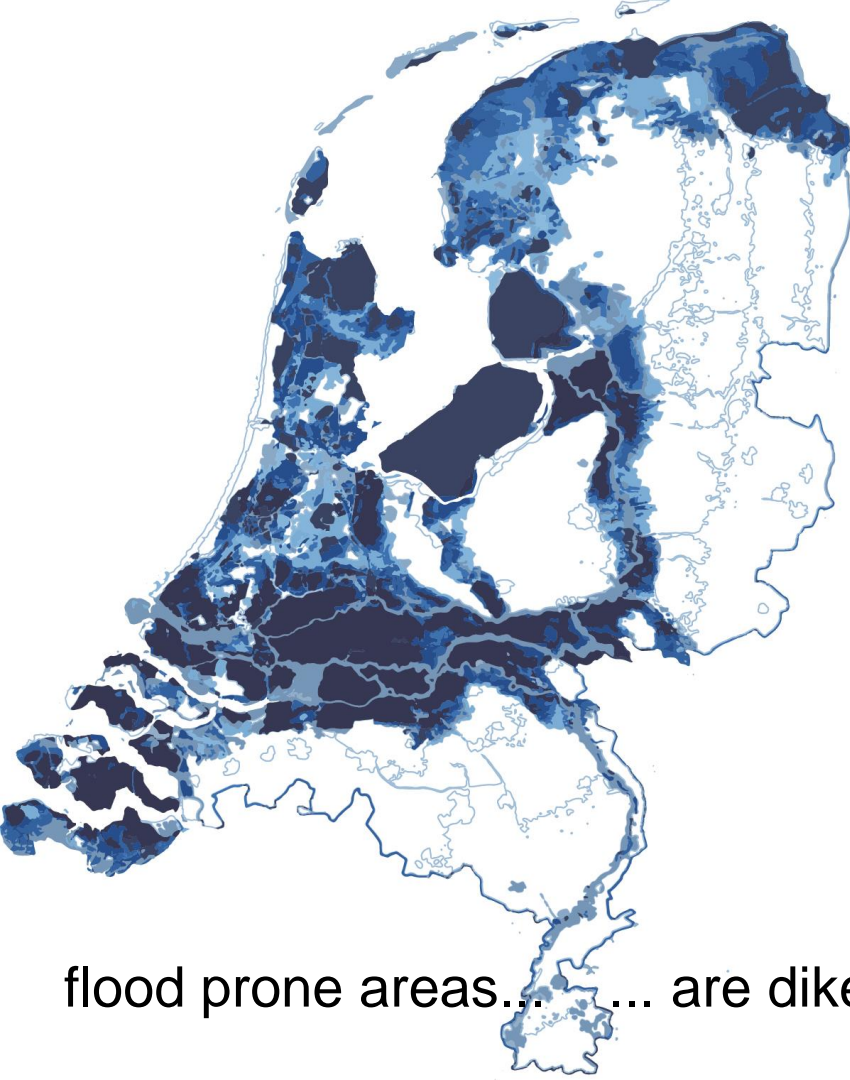
after the floods: joining forces since early medieval times

building and dike reinforcing dikes: higher and wider...



the netherlands without dikes...





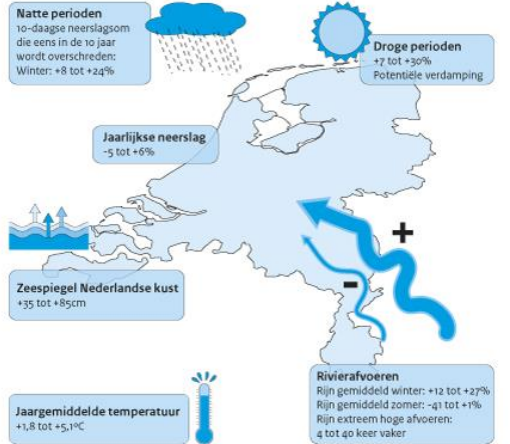
flood prone areas... are dike rings with legal protection against floods

new developments and trends



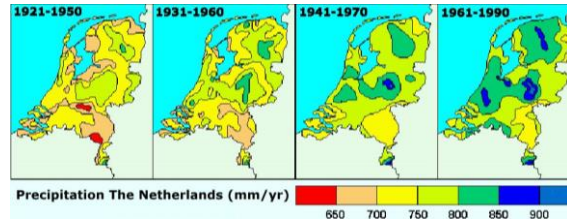
climate change

Mogelijke klimaatveranderingen 1990 – 2100

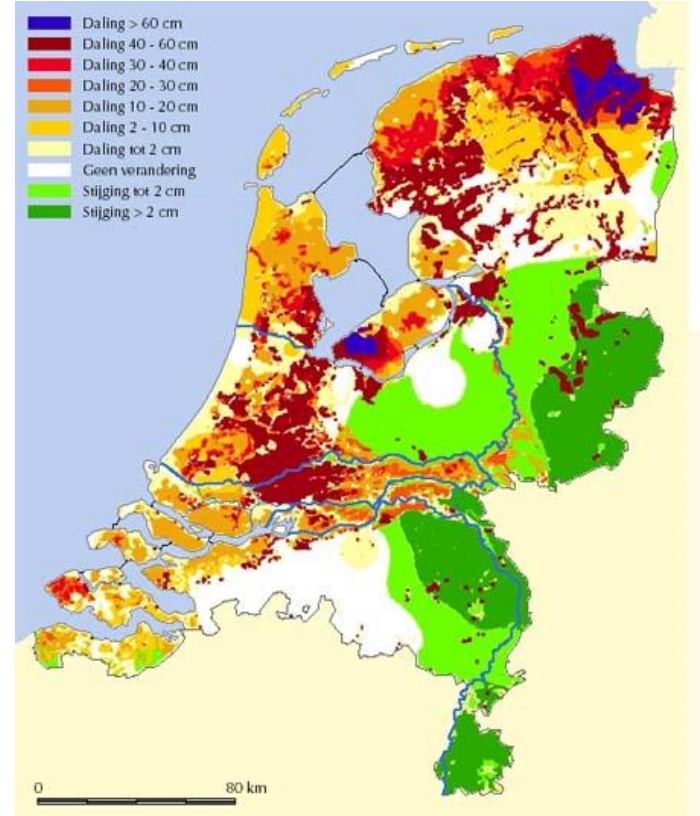


Bron: KNMI (2006 scenario's).

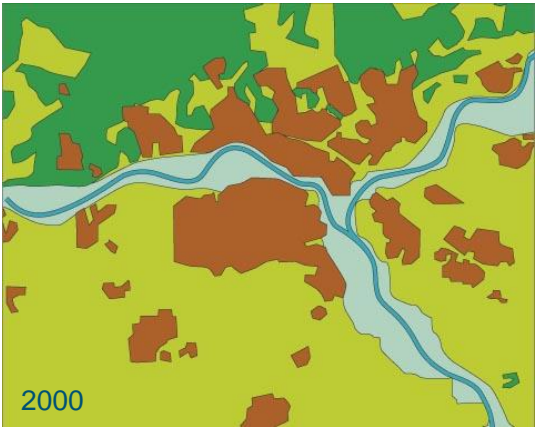
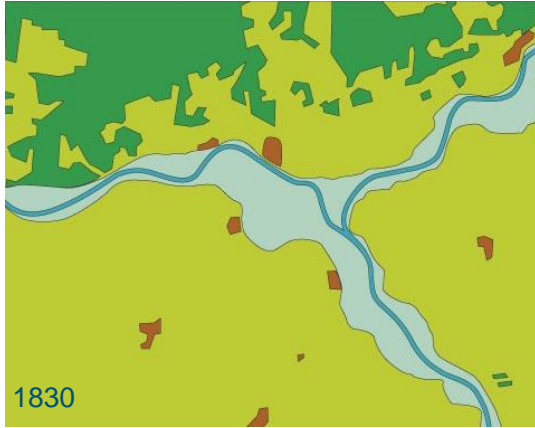
www.pbl.nl



land subsidence



urbanization



loss of floodplains since 1850



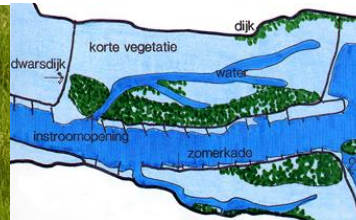
nature development along the dutch rivers: 'plan black stork'



restoring natural fluvial processes



Water vrij spel in uiterwaarden, landbouw in komgebieden
Plan: dijken doorsteken
Aanzicht op de...
De onderwerpen zijn met de...



it almost happened again...



... extreme river discharges in 1993 and 1995

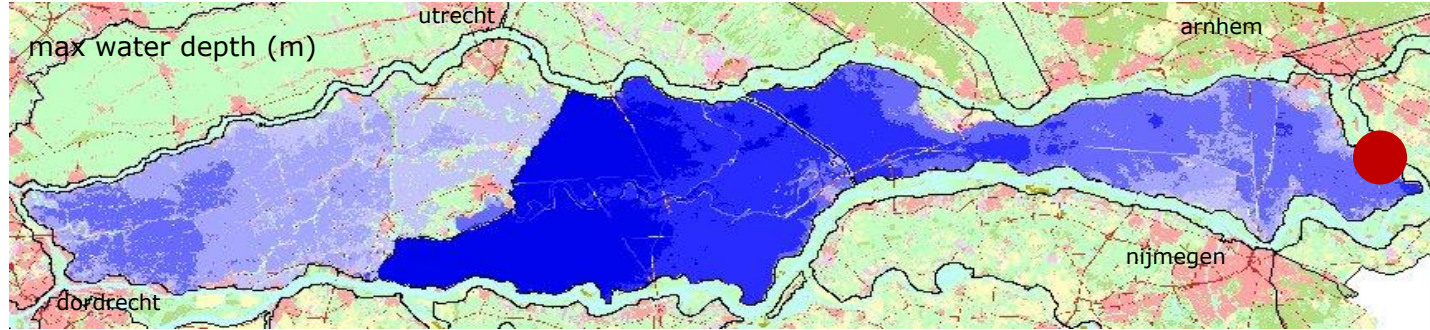
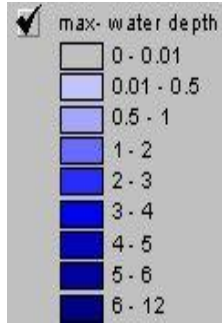


new flood protection policy

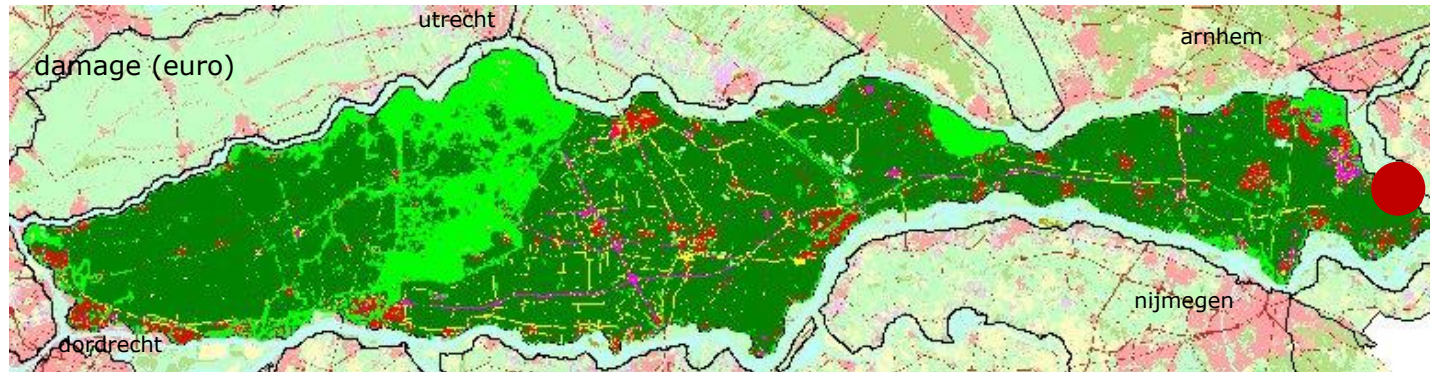
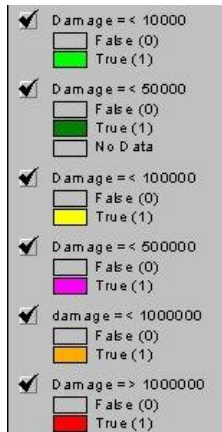


A Different
Approach to Water,
Water Management
Policy in the
21st Century

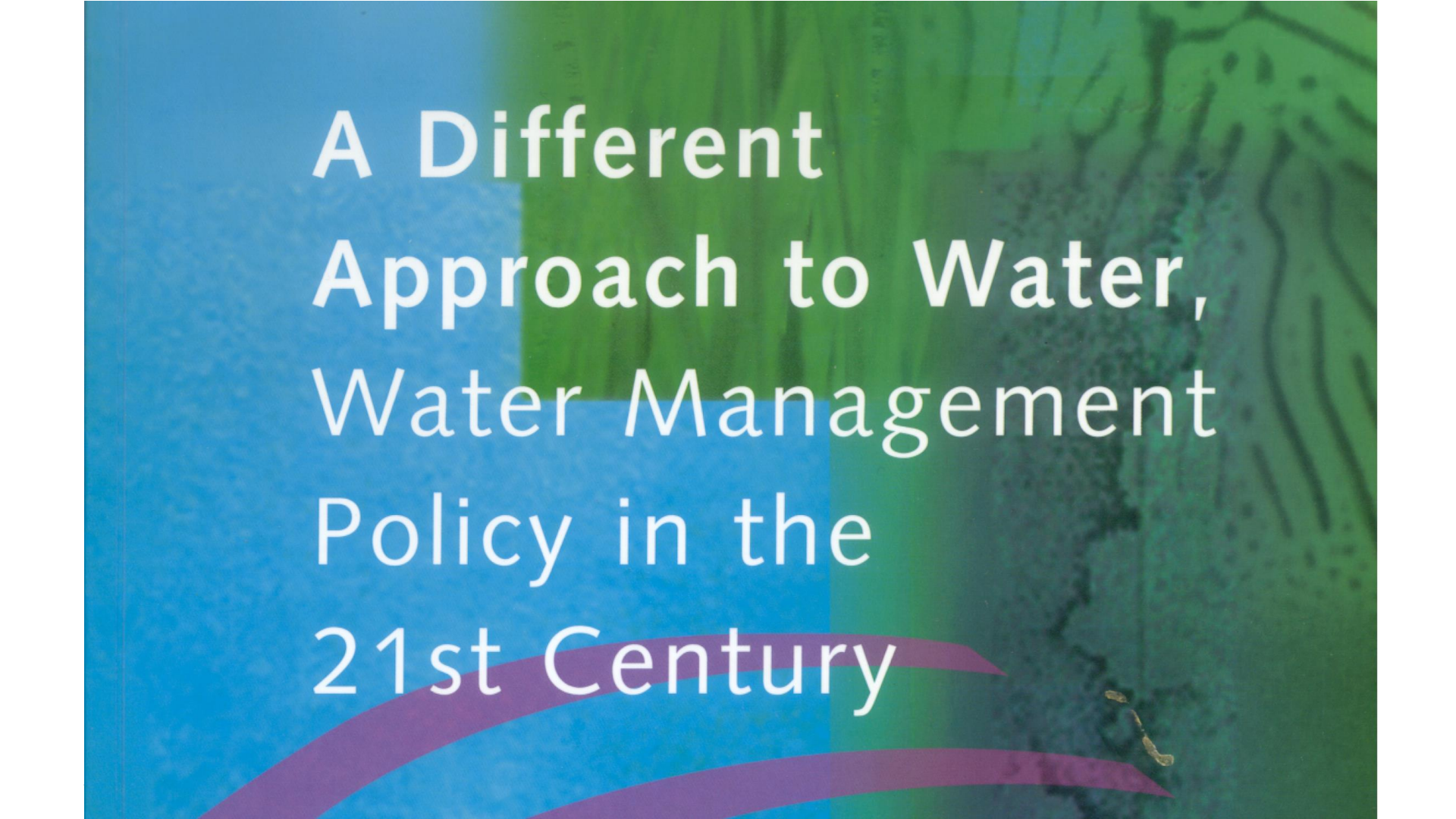
dike breach in the central river area of The Netherlands



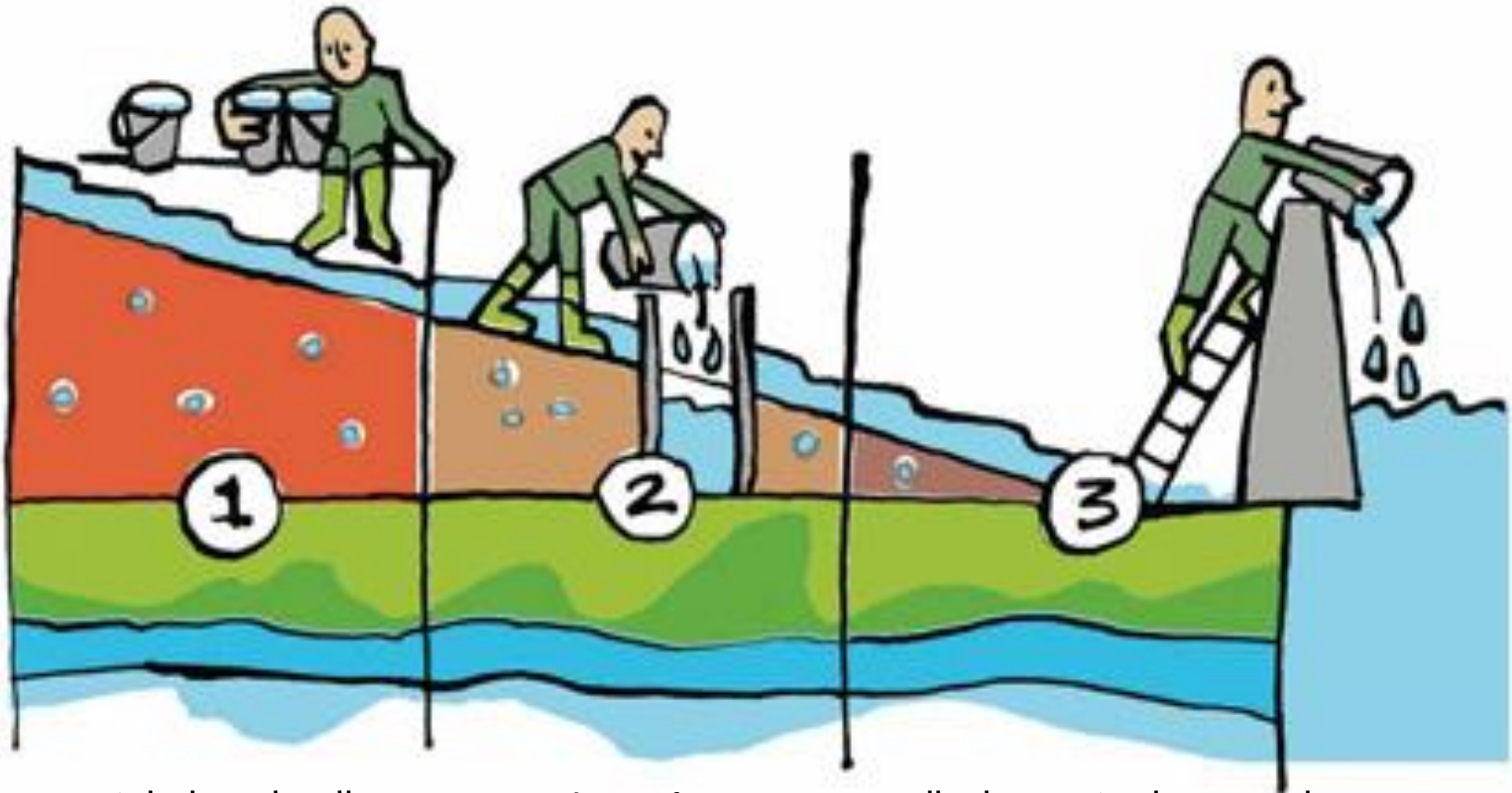
dike breach



dike breach



**A Different
Approach to Water,
Water Management
Policy in the
21st Century**



retain in subsoil

storage in surface water

discharge to rivers and sea



retaining precipitation by 'wadi' system (groundwater recharge)



surface water storage (combined with nature development and recreation)



increasing discharge by room for the river

“multi-layered” safety

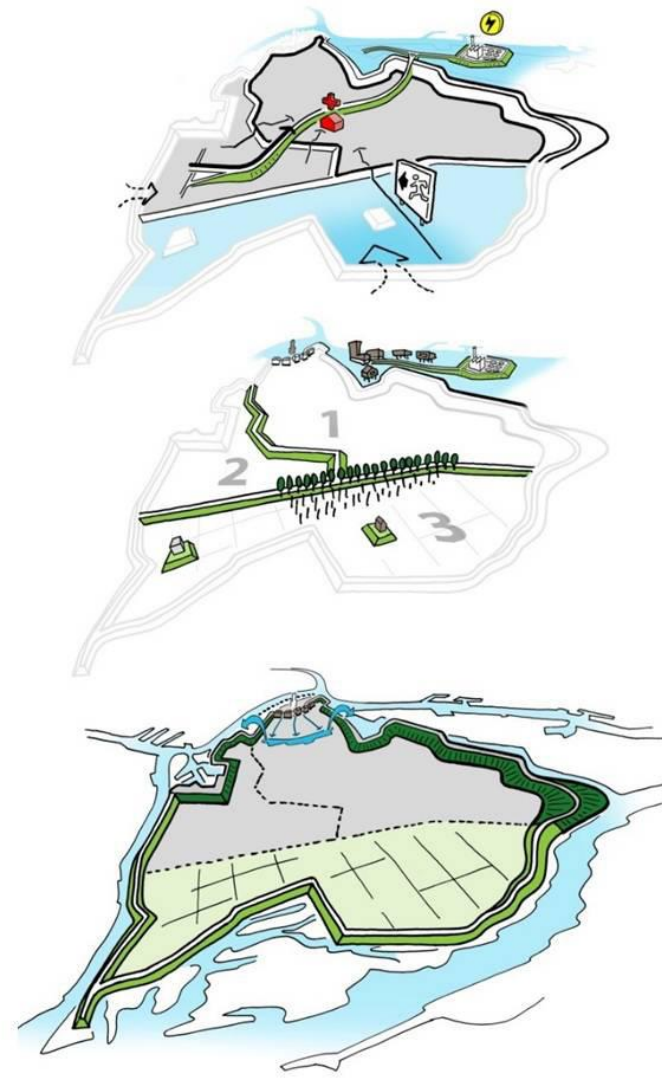
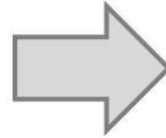
third layer:
evacuation



second layer:
adapt land use



first layer:
enforcing protection



room for the river: dutch design



room for the river program

- 34 projects
- 2.2 billion euro
- realised 2008-2017



creating more room for rivers



new high water gully



old dike high water gully new dike

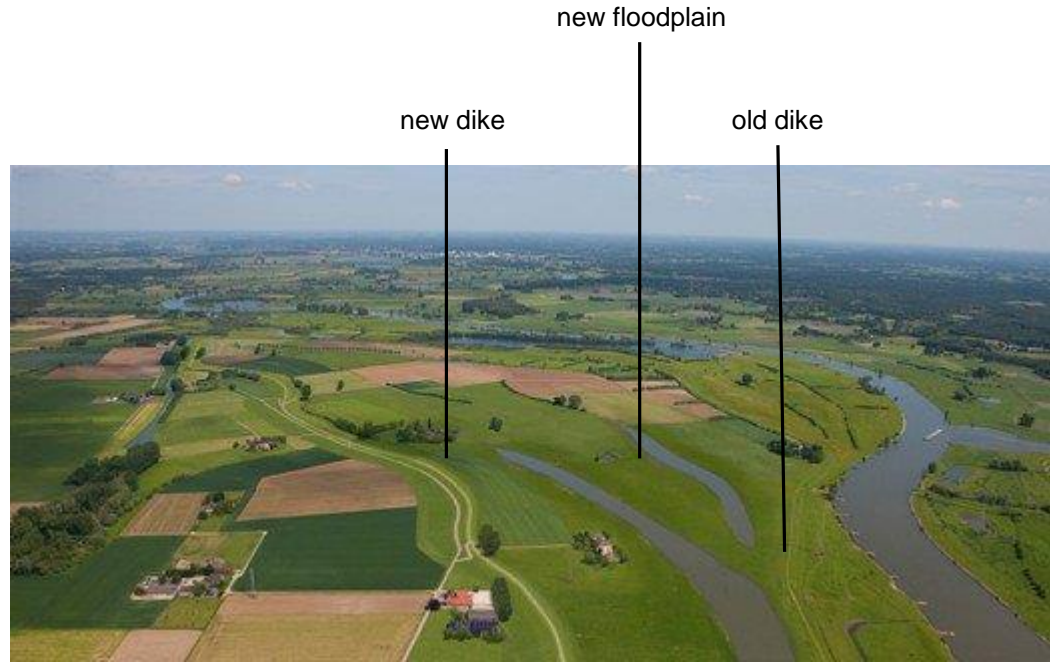


nijmegen: new river city-park

creating more room for rivers



dike relocation



zutphen: new floodplain with agricultural use

creating more room for rivers

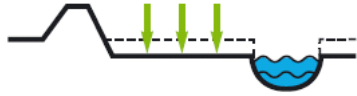


removing obstacles

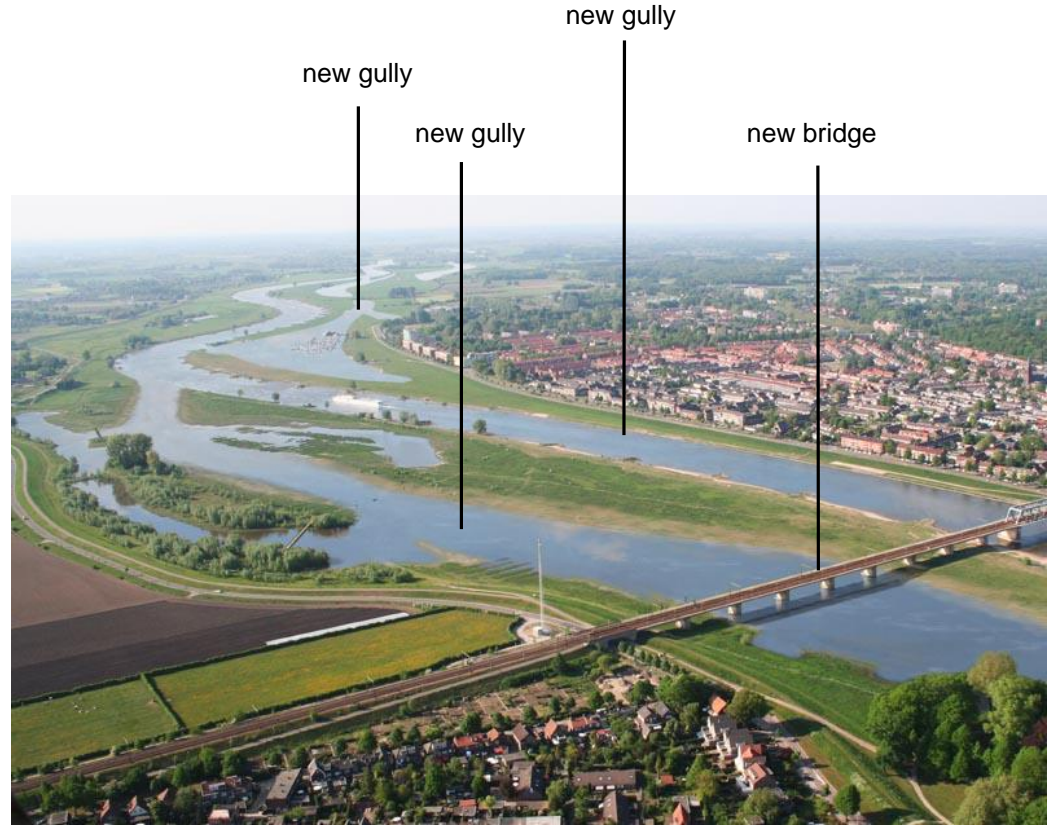


arnhem – oosterbeek: new bridge replaces dike

creating more room for rivers



lowering floodplain



room for the river: participative design





“sketch and match” sessions



“sketch and match”



- make sure context is clear
- analyse the area and its surroundings
- identify problems, opportunities
- possible solutions,
- potential policies,
- effects and means for realization
- by visualization and
- with local actors and experts

- and do it **TOGETHER!**

Flood Protection and Planning in The Netherlands

thank you for your attention...

... any questions?

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net risk work



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