



Water quality is water quantity

Climate adaptation in the east of the Netherlands

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Brief introduction: Climate change worldwide (IPCC)

Planetary Boundaries

after Johan Rockström, Stockholm Resilience Centre et al. 2009

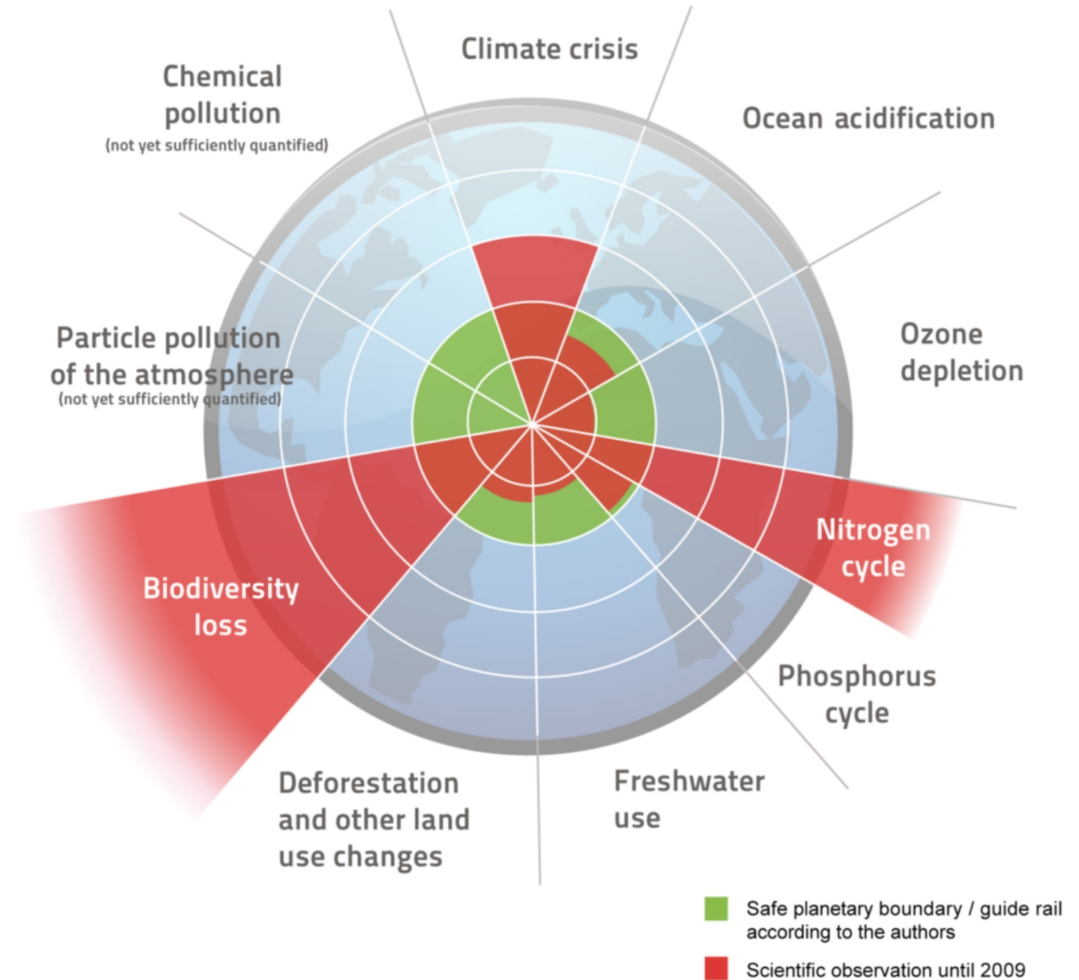
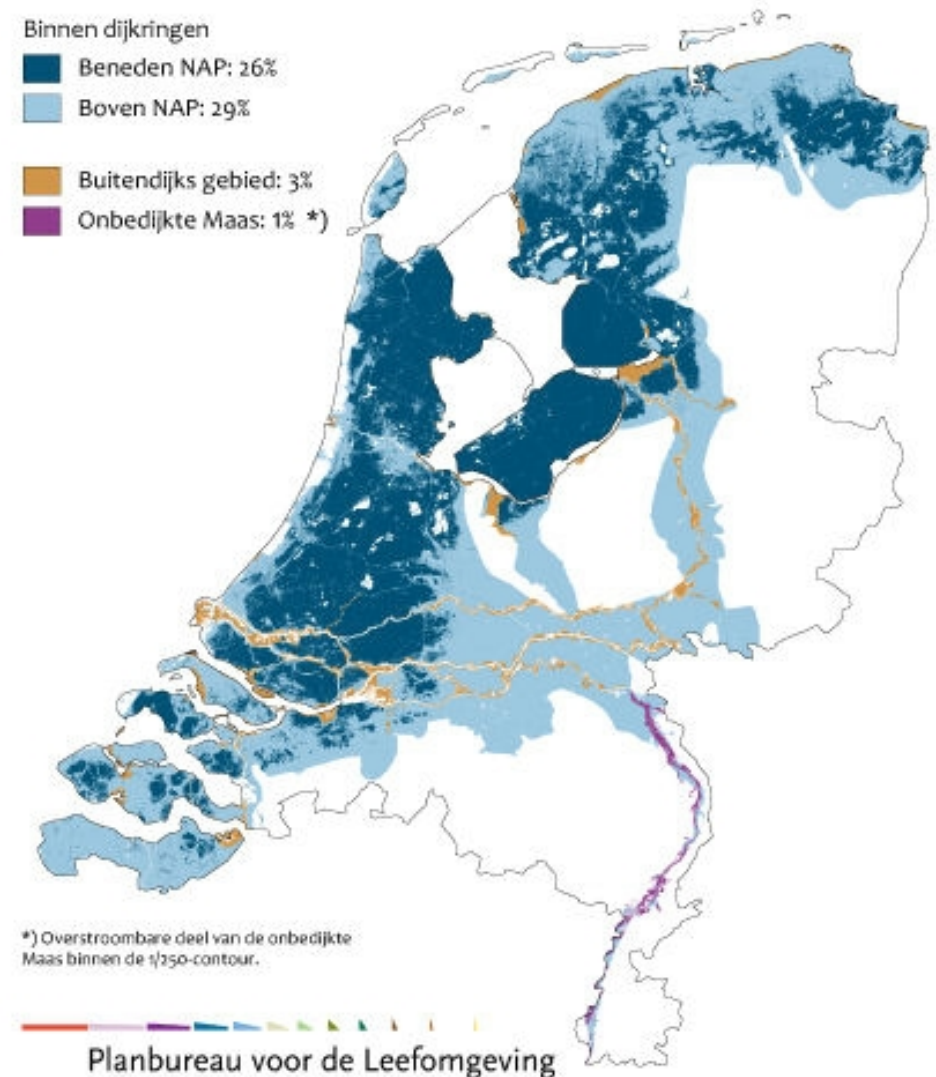


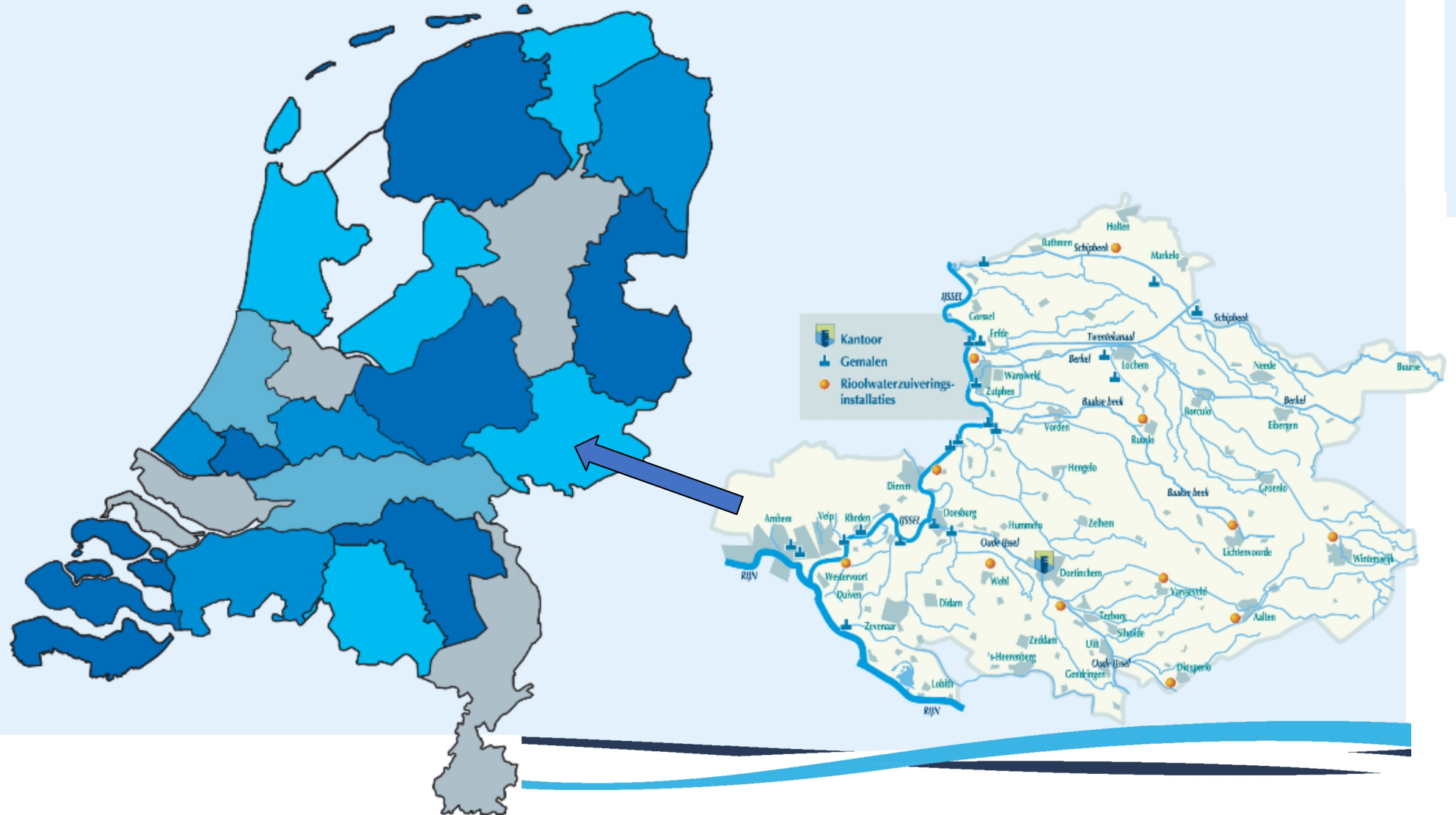
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Brief introduction: Water: friend and foe

- 60% below sealevel
- top level water management
- draining water champion
- economic and agricultural growth



Brief introduction: Water Authority Rijn en IJssel



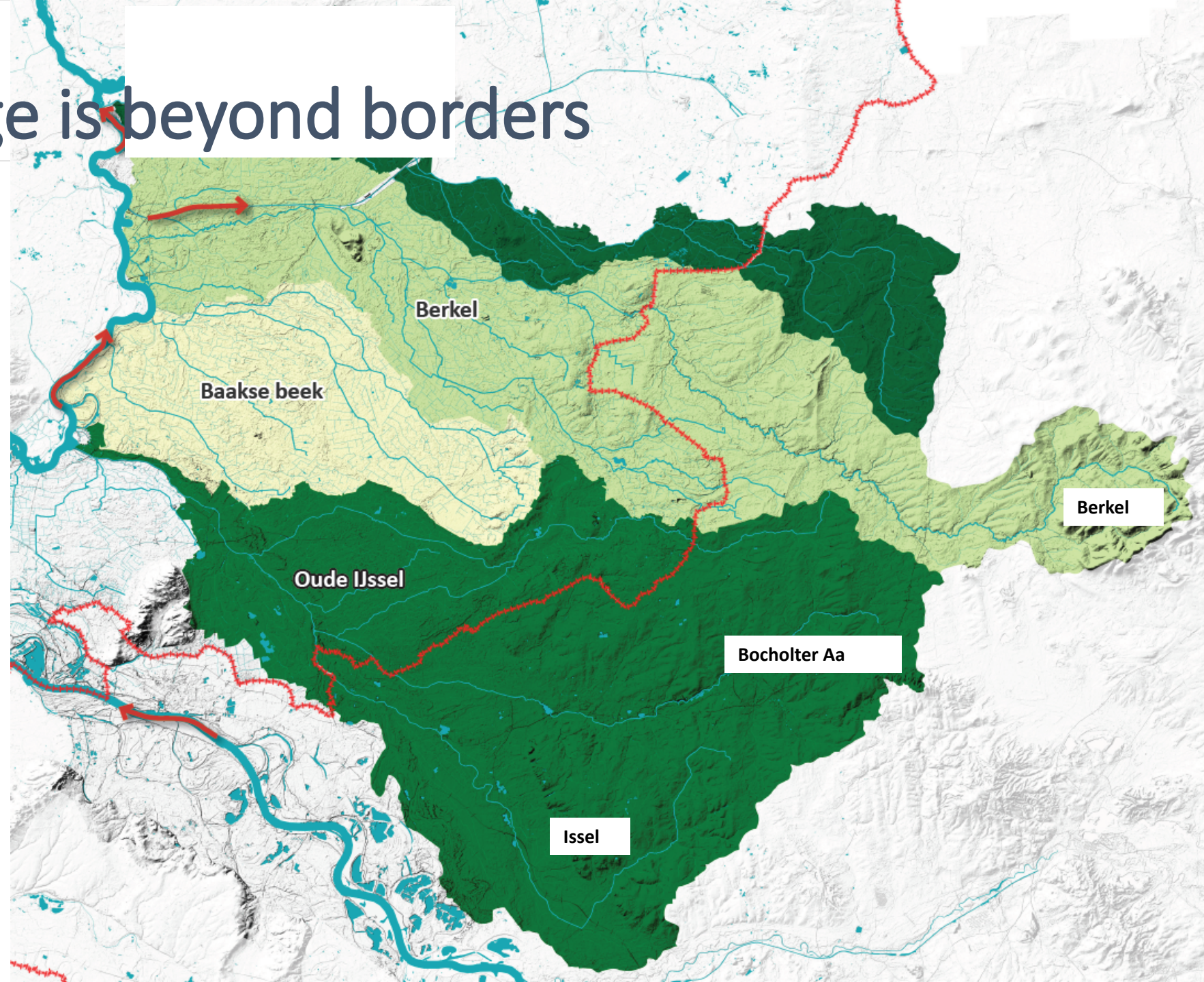
Climate change: priority and urgency

- Effects of climate change: extreme rainfall, floods, heat and drought.
- Reduce climate change: energy neutral in 2025, circular and sustainable energy goals



Climate change is beyond borders

Shared river basins:
43% in Germany



1: Floods



Lichtenvoorde 2010



Limburg, 2021

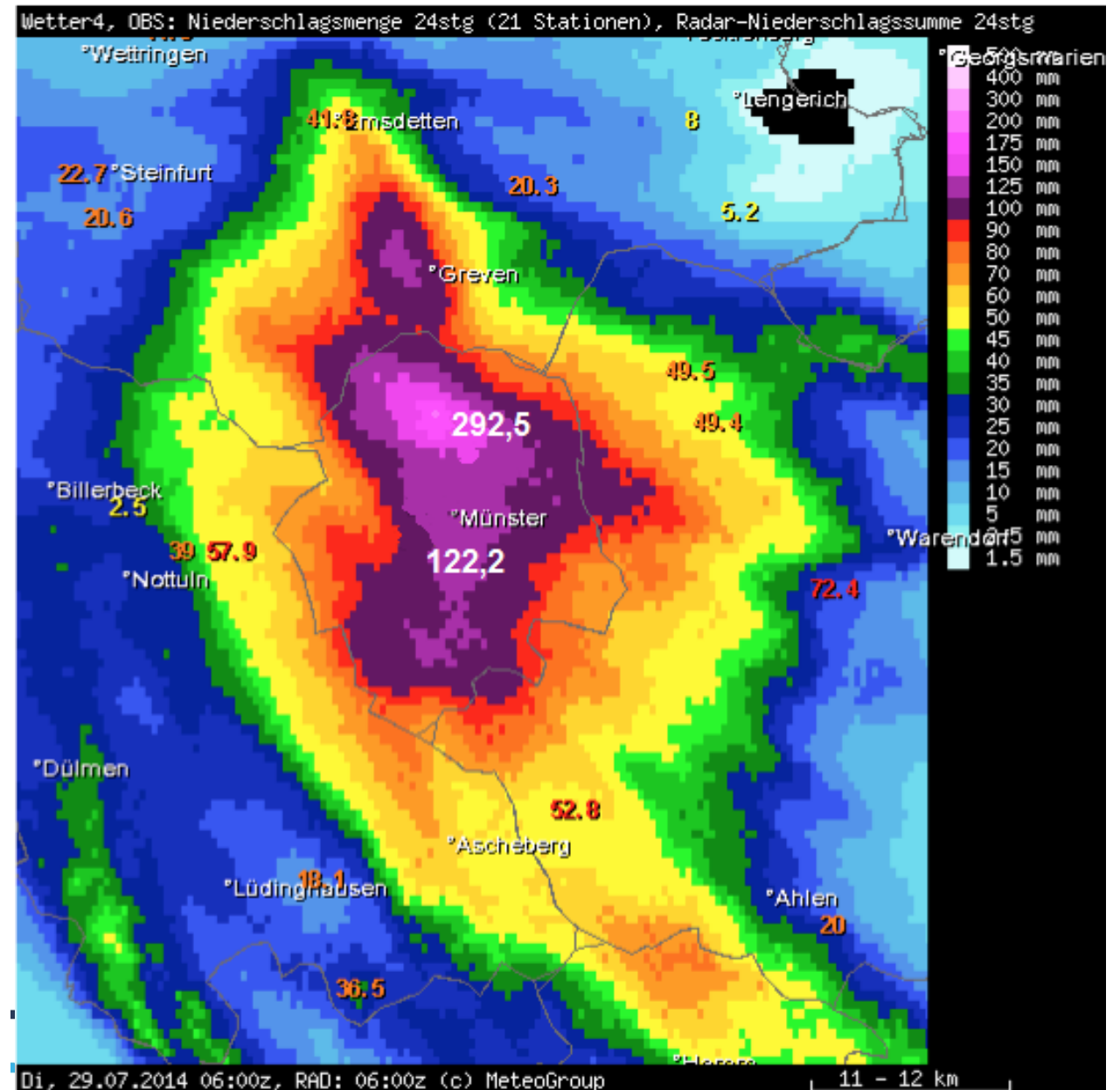


Example: Munster

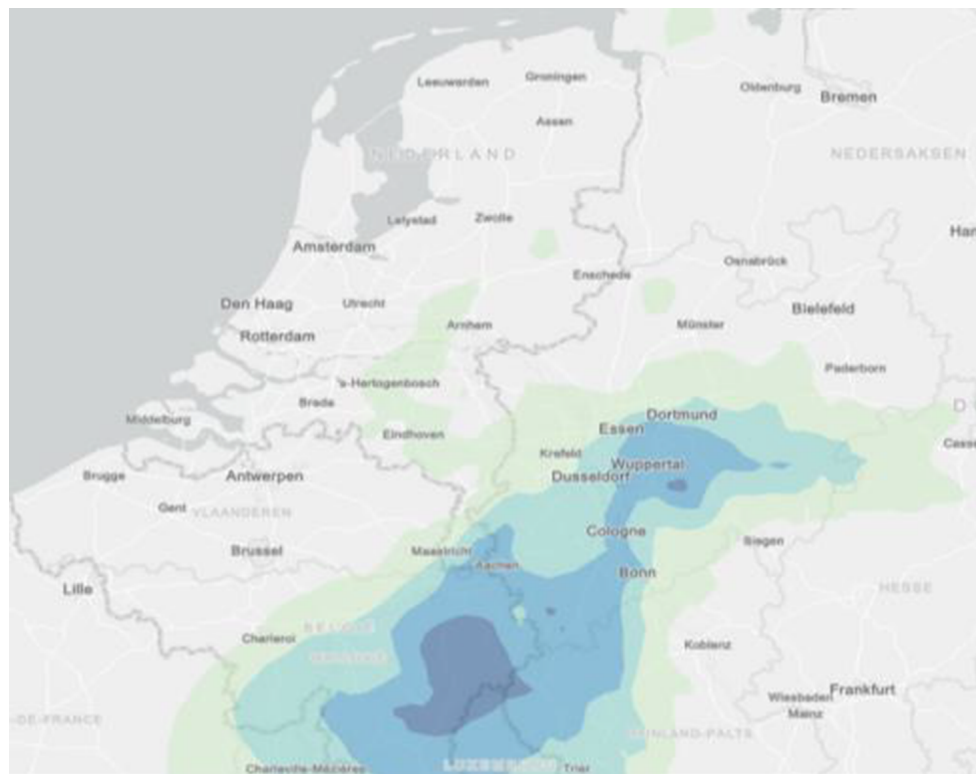
- Almost 300 millimeter in very short time: 7 ½ hours
- Only 50 km distance of the Dutch border



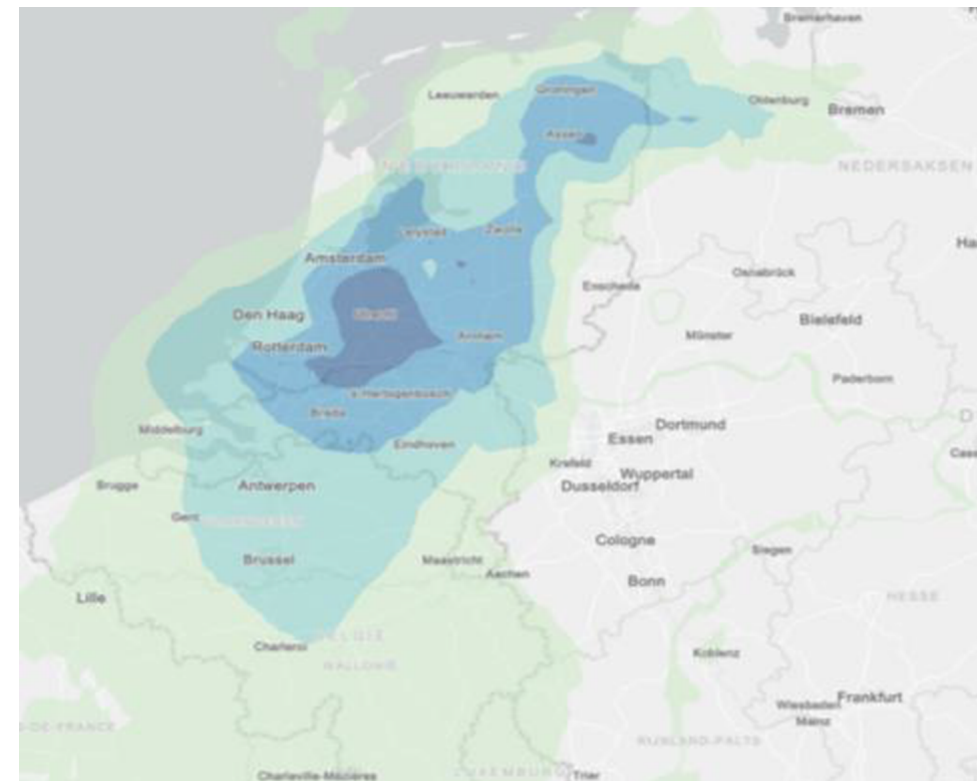
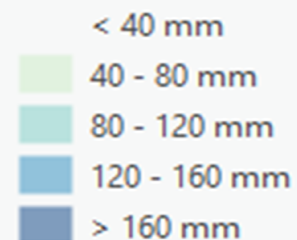
Foto: DPA



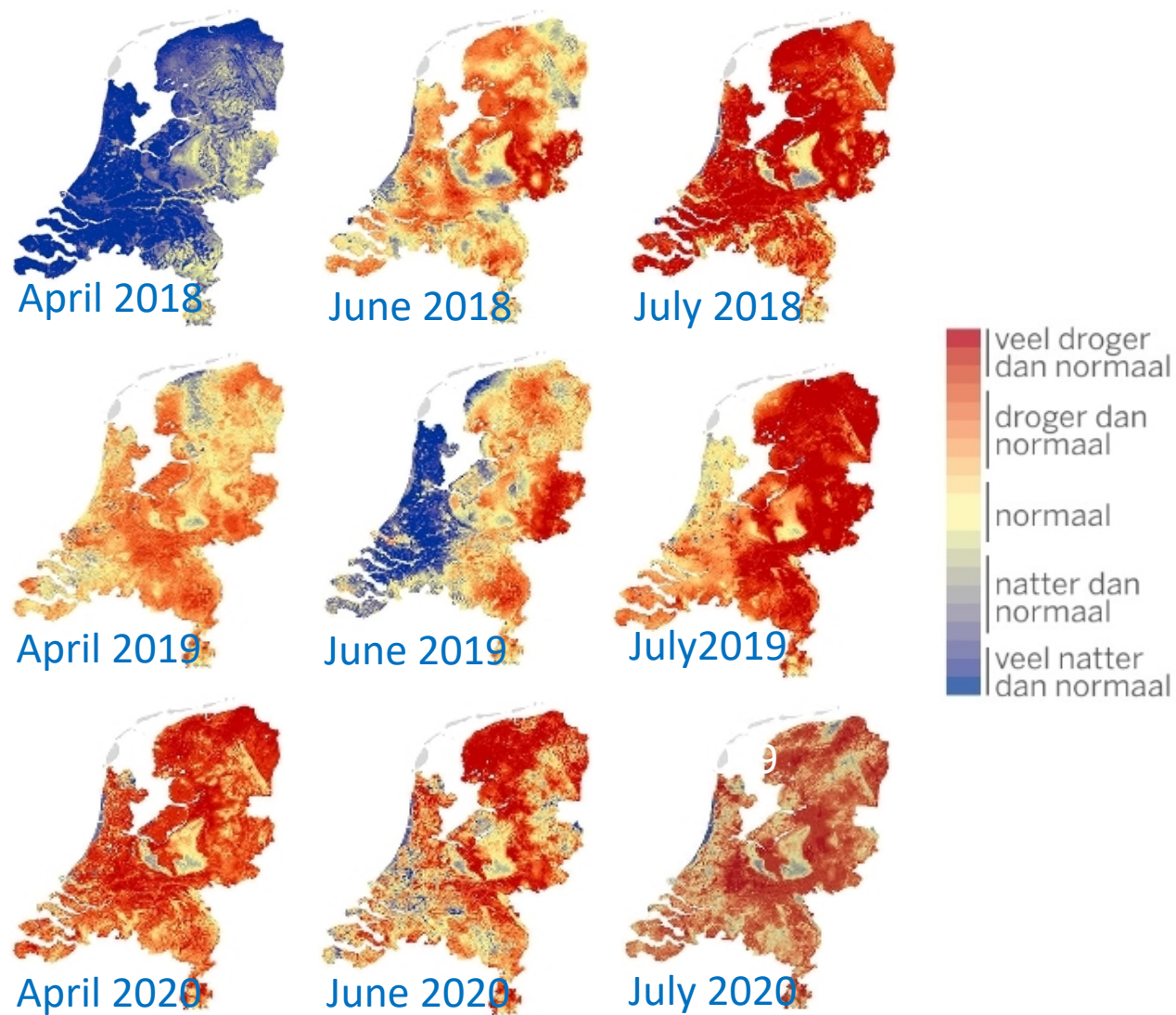
What if... the waterbomb could fall anywhere



Neerslagsom 48 uur



2. Drought

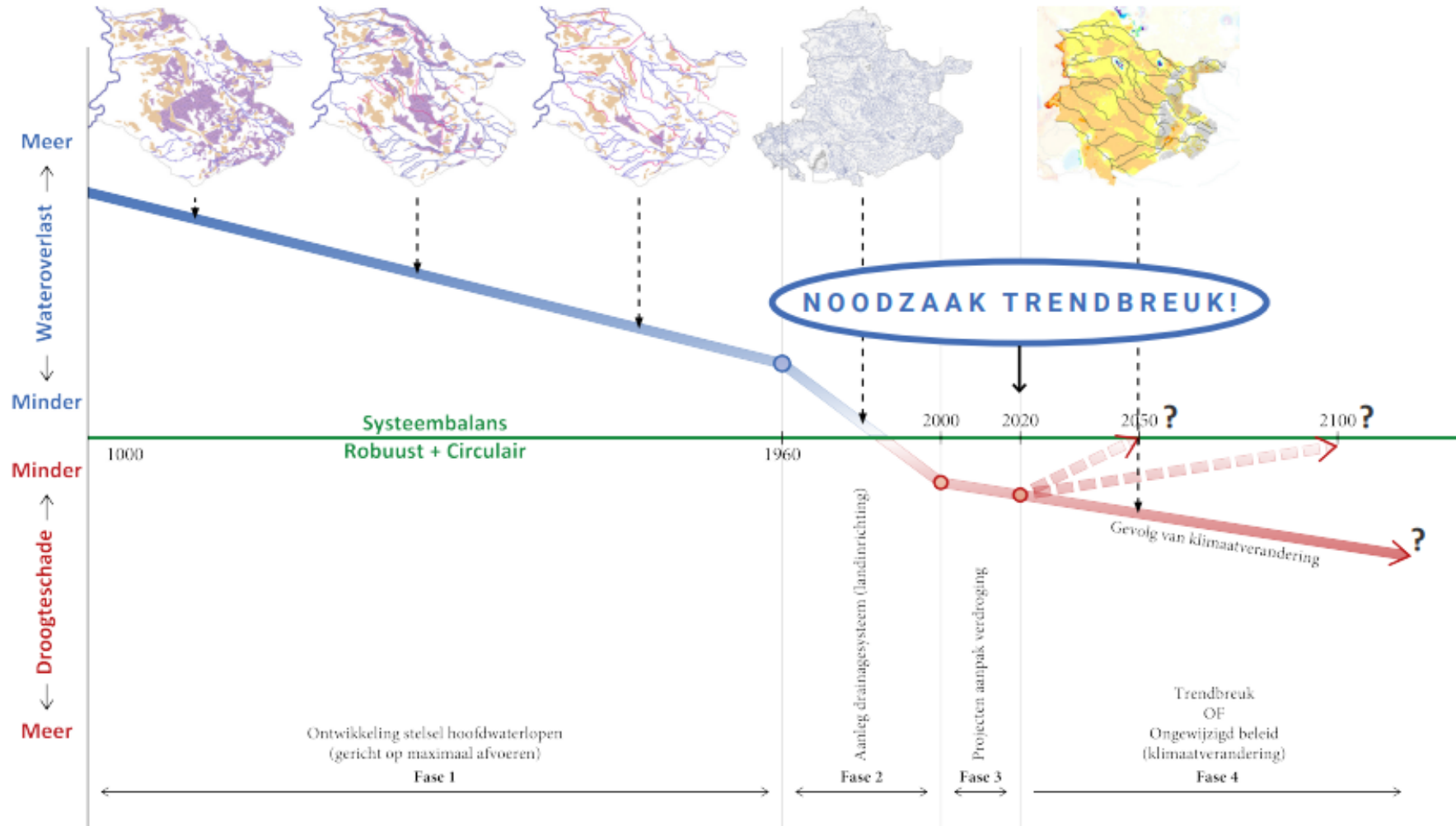


Position (high and dry) and problems



Mind shift is needed

DE ONTWIKKELING VAN HET WATEREN SYSTEEM VAN DE ACHTERHOEK (IN VIER FASEN)



Measures: mindshift

- New water balance!
- Local watersystems, local solutions with local partners
- Connecting to the local water system
- Respect to nature, culture and history
- Starts with conversation and awareness





3. Measures

Large: >30 mm

Medium:

30-5 mm

Small:

<5 mm



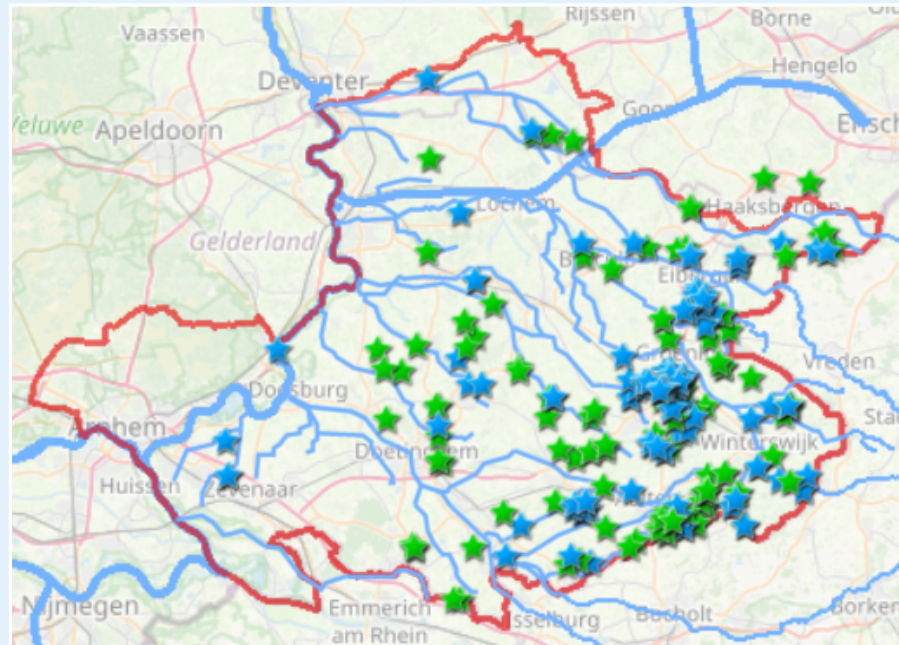
In summer 2021, floods and damage in Limburg. Or worse, with people dying in Germany.
In our region was only local inconvenience, but the 'water bomb' can fall anywhere

Measures: water storage



Measures: water retention

- Rise waterlevel and place dams on own property
- Almost 200 dams en 150 skippy balls on private property: 'Every drop counts' program





Measures: “Every drop counts”

- Program for land owners
 - Catch, store and insert (rain) water in the ground
 - Local watersystems, local solutions, personal meetings
 - No-regret measures in the smallest parts of the water system
 - Retaining water at plot level by connecting to the natural water system
 - Quick implementation and quick profits
 - Awareness and action perspectives for land users
 - More and more land owners, mainly farmers, join this program (>300 interested, almost 200 dams placed)
- 

Measures: drainage base higher

“t Klooster”

- Water catchment area
- With local farmers, water company, water authority
- Leading water from river into the farmers' ground
- Pilot succesfull for soil and crops

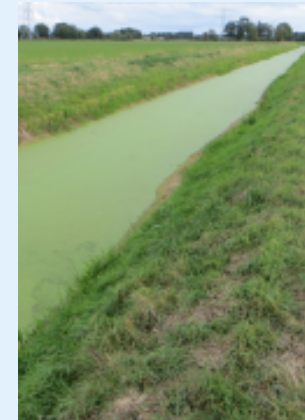


≡ Measures: soil care

Farmers program: “the fertile cycle”

Goals:

- Reducing risks of dry and wet periods and climate change
- Reducing leaching of nutrients
- Optimize crop production and use of minerals



Other activities



Research: innovate techniques



Monitoring: water quality



Measures: re-use organic materials



Experiments: 'new' crops

Powerful consortium



300 dairy farmers



Cooperation for integrated approach

❖ Regional cooperation on drought

- Province
- Water company
- municipalities
- Farmers Association
- Nature NGO
- Regional NGO
- and water authority

❖ Public awareness

‘Weet van Water’

Municipalities, citizens and water authority



Estate: Wildenborch

Estate owners, Regional landscape organization, Farmers Association, municipality and water authority



Conclusions

- Water quality = water quantity!
- Climate change = behavioral change (awareness)
- Cooperation between governments, companies, citizens, organisations
- Local solutions, global succes
- Last but not least: Good governance!



Any questions?



≡ (EXTRA:)Results Fertile Cycle program

Main sources of nutrients in surface waters:

- Germany
- Sewage treatment plants
- Diffuse sources from agriculture

Nutrients surface water:

- Total nitrogen sufficient in many large water courses or close to standard
- Total nitrogen in smaller watercourses often local negative effect
- Total phosphorus mainly higher concentrations and loads during discharge peaks.
- Ammonium is already toxic to biology at low concentrations.
- Many exceedances due to temporary peaks caused by continuous organic (manure) flows, for example.