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# Cooperative agreements between farmers and water suppliers successfully addressing diffuse pollution in in the watershed of the Wahnbachtalsperre, Bonn/Germany

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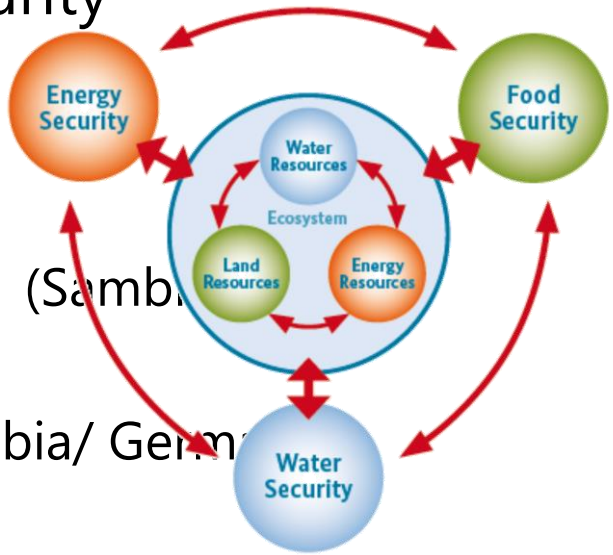
June 28, 2016

# WEL nexus project

- Incentives and instruments for implementing the water-energy-land nexus (WEL nexus)
- Objective: analyze incentive structures, governance mechanisms and policy instruments that account for intersectoral interdependencies in resource use and that enhance water, energy and food security
- Nexus case studies, e.g.
  - Hydropower in international rivers
  - Water-intensive agricultural investments (Sambi
  - Cooperative agreements/ payments for ecosystem services (Colombia/ Ger

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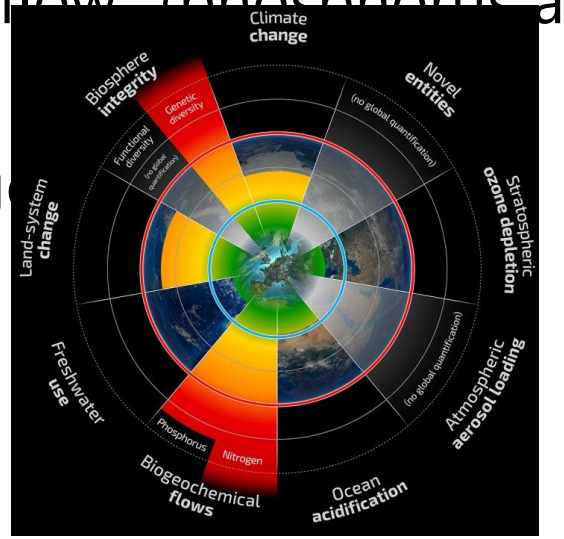
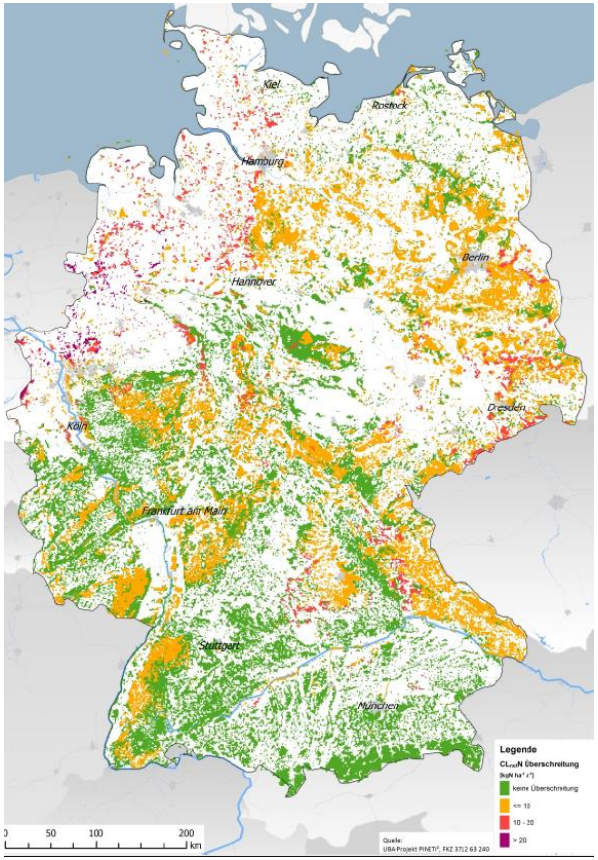
# Nexus and planetary boundaries

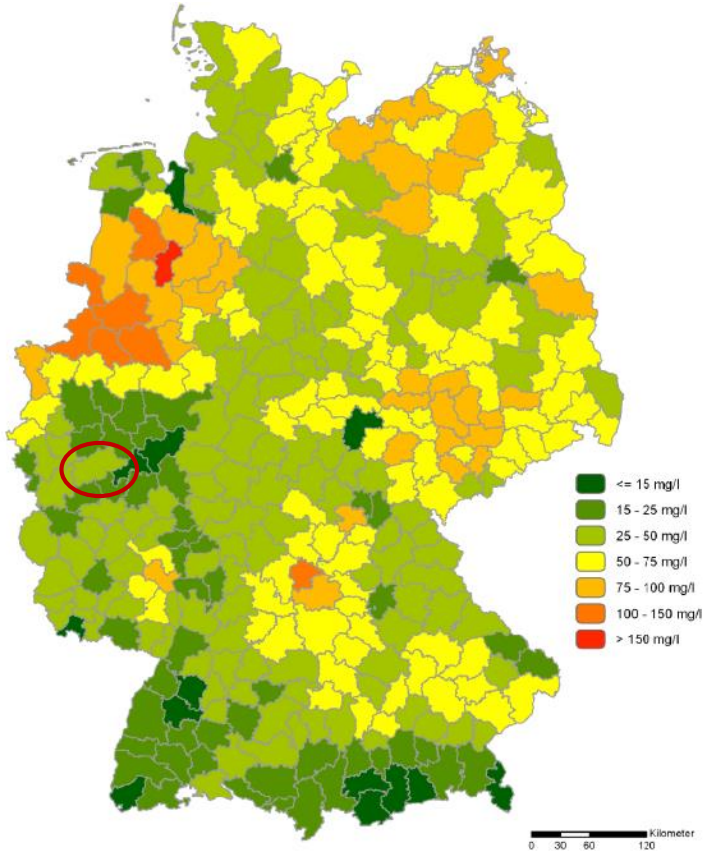
- Agriculture often main source of water pollution
  - Intensified production to meet growing needs (food, feeds, fibre, fuels)
  - Water pollutants from agriculture: runoff and leaching into water systems from nutrients, pesticides, soil sediments, and other contaminants (e.g. veterinary products)
- Planetary boundary "biochemical flow" (phosphorus and nitrogen) has been crossed!
- Biodiversity, health, climate chang



# Nitrate pollution in Germany

- Germany: 48 percent of ecosystems are polluted
- In 133 counties nitrate concentration is > 50mg/l

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# CA as response

- Many OECD countries face significant costs from water pollution
- Policy responses were quite costly: typically a mix of economic incentives (taxes and subsidies), environmental regulations (prohibition and specific rules backed by penalties) and farm advice and education
- Addressing non-point source agricultural pollution is complicated (invisible due to low concentrations, taking diffuse pathways into water systems)
- Innovative approach:  cooperative agreements, supported by programmes on national and EU level

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# Characteristics of CA

- Cooperative agreements (CA) can enhance the effectiveness of existing regulations
  - Voluntary, relying on self-interest
  - Self-regulation
  - Water supplier negotiates and/or provides financial resources
  - Specific area (water catchment area, water protection zone) (Brouwer et al. 2003)
  - Payments for water ecosystems (PWES)
- Coase model (bargaining model): "result of negotiations between farmers and water supply companies"
  - Water companies: better water quality
  - Farmers: cost savings for agro-chemicals, compensation payments, free advisory services, technical support

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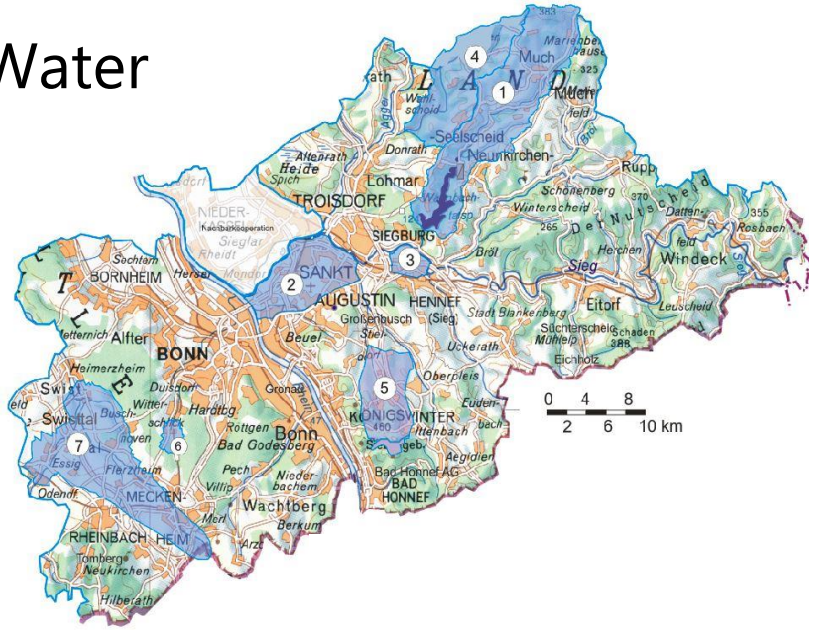
# Nexus – CA in Germany/Bonn

Wahnbachtalsperre, Bonn, Germany

Agriculture – Water




Total area: 7000 ha

Agriculture: 4000 ha
(3600 ha grassland, 400 ha crop farming)

800.000 people

# Research objectives

- Analyze CA as a nexus managing instrument
  - Look at the incentives for engaging in the CA and at the favoring factors of a successful CA
  - Analyze its usefulness in addressing cross-sectoral externalities (nexus!) with regard to developing countries

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# CA Wahnbachtalsperre

## Why compensate?

- Extensification of agriculture for increased provision of water-related ES (erosion control, reducing nitrate and phosphate pollution)

## Who initiated?

- Ministry for Environment and Agriculture (since 1985) asked water and agricultural sector to come up with a solution (50mg/l!)

## Who participates?

- 154 farms (4,000ha )

## How much is compensated?

- Mainly in-kind transfers (provision of technology and know-how), practice-based

## Who coordinates?

- Informal association based on statute
- Main actors: farmers and advisory council (water supplier, chambers of agriculture, regulatory authorities)

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# Favoring factors of successful CA

## Financial

- Water suppliers bears the costs of cooperation (1 million Euro in 2015; 2-3 cent/m3 drinking water)
- Costs are refunded by the government (water abstraction charges);
  funds provided are not fully used

## Legislation

- Water protection (nitrate 50mg/l), framework for cooperative agreements

## Participation incentives

- Participation is voluntary; famers play a key role; consensual actions

# Favoring factors of successful CA

## Geographic scale and problem complexity

- Small watershed; local cooperation; small, few number of farms
- Available solutions

## Institutional

- Ministry oversees agiculture and environment
- Extension service on water protection and agricultural production via agricultural chambers

## Agricultural structure

- Extensive production, clear property rights

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# CA useful in addressing the WL nexus

- Linking land use to hydrological ecosystem service provision as physical cause–effect relationship within the river basin
- Internalization of land use–related water problems as a site-specific solution
- Upstream–downstream cooperation between hydrological ecosystem service providers and buyers
- Cross-sectoral dialogue between land use and water users

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# Thank you for your attention!

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