Water consumption and nitrate load of selected energy plants

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Goals

- To develop a new, rapid measurement approach to detect the influence of energy plants on the water cycle
- To establish a database for Baden-Württemberg to be used by the energy sector and for water management
- To provide data for environmental assessment focusing on water use, groundwater recharge and nutrient export from the different energy plants.
- To suggest a new land use planning finding optimum between water protection and bioenergy use

→ Environmental friendly use of bioenergy related to its implication on water use and water quality
→ Targeted use of energy plants to improve water quality
→ Targeted use of energy plants to reduce flooding

Current research progress

- Sampling at 13 locations in Baden-Württemberg covering the main soil types and geology for a variety of different energy plants previous and after the vegetation period
- Analysis of soil cores (1.5–2.5 m deep) in the lab for each 10 cm for:
  - Soil water stable isotopes ($^{18}$O and Deuterium)
  - Nitrogen (N-Nitrate) in the soil water
- Soil hydrological models calculate water consumption of plants and nitrate loads
- Statistical analysis to detect the difference among energy plants and grassland

Future research

- Continuous sampling and data analysis
- Extending the database
- Relate effects with vulnerabilities

→ Planning land use for energy plants
→ Strategic cultivation of energy plants

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