Results and Recommendations: Water Quantity - Drought

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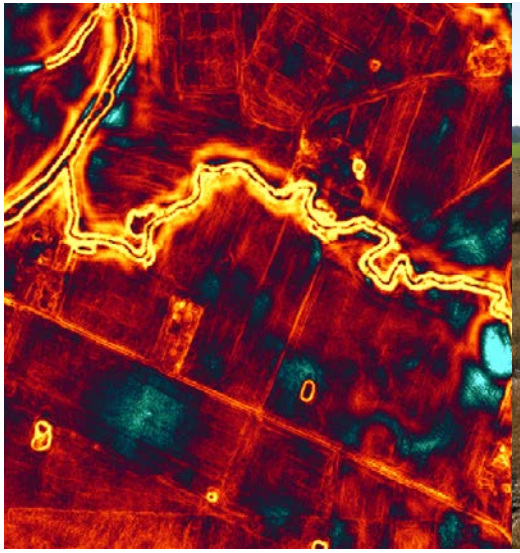


European Union The European Regional Development Fund

Investing in the future by working together for a sustainable and competitive region

The Interreg IVB North Sea Region Programme

The issue - drought

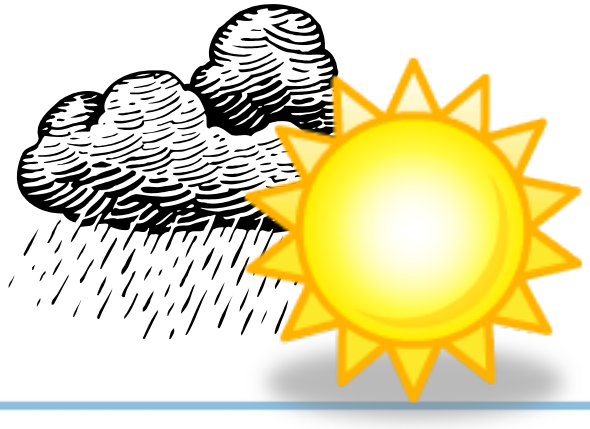
Present situation in NSR:

Drought recurrence every few years (e.g. Sweden) or every year, different seasons or regions (e.g. Germany, Netherlands, Denmark)

Shortage of surface water (e.g. Sweden)

or groundwater (e.g. Germany, some regions)

Climate change :



Increase in amplitudes, i.e. more extremes (Sweden), shift in crops (Netherlands), unclear effects on groundwater (Germany), more need for irrigation (Germany)

The objective - drought

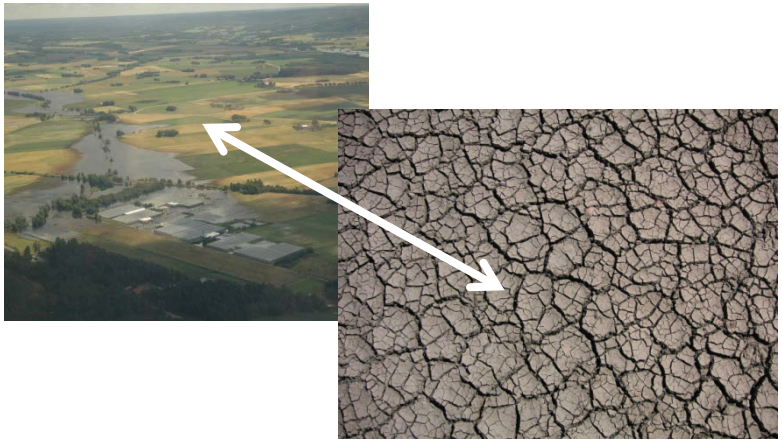
To find a solution where farmers can act as water managers and cope with present and future drought situations with positive effects also on e.g. the WFD

- Find technical solutions
- Present participatory planning possibilities (where all stakeholders are involved)
- Find Win-Win solutions (production, economy, environment, biodiversity etc)

Results: Technical Findings

Examples from **Sweden**

- Hydrological studies: drought a greater problem than floods (contrary to previous beliefs)
- New tools presented, e.g. local network of low cost climate stations.
- Farm-based studies on irrigation needs – wetlands



Examples from **Germany**

- At farm level: very small differences in need for water (varieties of crops, different seeding techniques, precision irrigation)
- Construction of a ”summer bed” in the riverbed to minimize the need for waterflow in dry periods.
- Upstream creeks lack connection to main groundwater level.
- Effects of groundwater extraction decrease if taken from lower main groundwater-layer.
- Rain Harvesting activities: depends on the local situation.

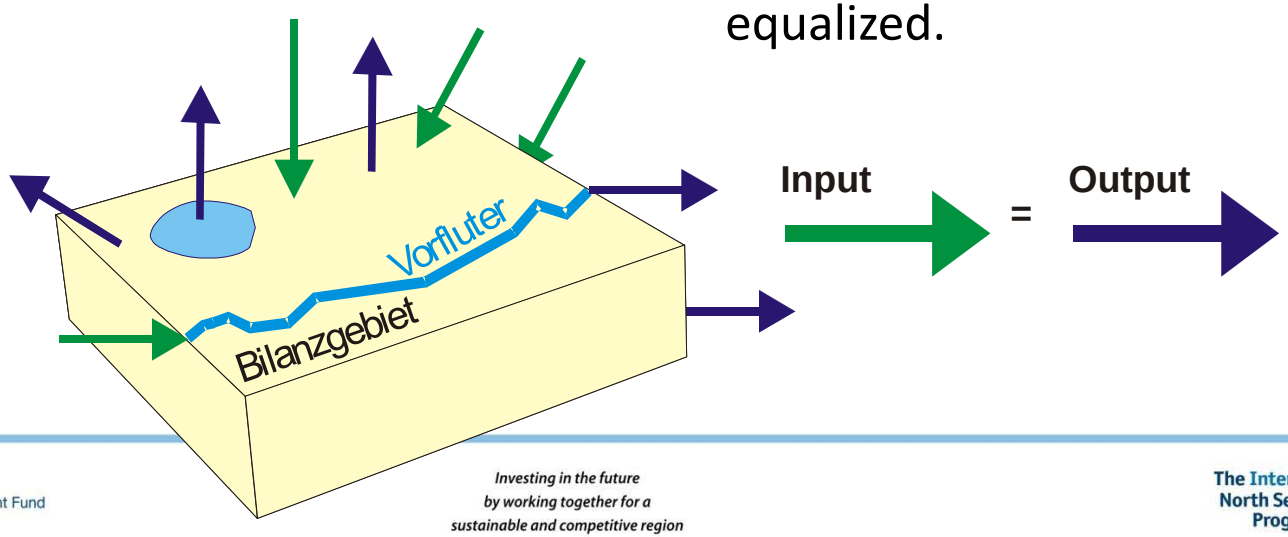
Results: Institutional Findings

Examples from **Sweden**

- Administration of subsidy systems for wetland construction is not optimal in terms of communication
- Authorities can be important partners for supporting the formation of local farmers interest groups (e.g. Water councils, irrigation groups).

Examples from **Germany**

- Efficiency of measures to increase local seepage should be optimised – a regional "seepage efficiency map".
- "Balancing areas" need to be defined where measures and groundwater extraction can be equalized.



Results: Participatory Findings

Sweden

- Water councils at catchment level are good Win-Win solution for sharing the water with respect to the environment
- Creation of local irrigation groups of farmers (close contact with advisors/authorities)

Germany

- Financing of Rain Harvesting measures to increase the groundwater recharge would be done by farmers, if clear schemes are developed how the investor will profit (“crediting” for measures)

Recommendations - drought

Sweden

- Controlled flood areas (wetlands) should be set aside to avoid damage by flooding in more important areas
- Downstream effects of measures, e.g. flood regulation, considered to a larger extent
- Create Integrated drought management plan for the catchment

Germany

- Continue research on farming methods for more effective (=economic!) use of water
- Research on plant-physiological irrigation steering (identify most water-dependant phases).
- Improve quality of the creek beds**.**
- Investment programs + legal schemes to install Rain Harvesting measures
- Extraction of water only from the lower (sandy) aquifer (which is opposed to recent policy).
- Install information strategies for general public.

Win – Win

- A catchment or sub-catchment based drought management plan leads to:
  - Increased yields, secured production, viable farms
  - Better hydrology in streams for biota (water quantity)
  - Decreased nutrient transport to streams by recirculation of irrigation water and decreased leaching losses (Water quality)
  - Increased awareness of catchment concept by farmers, advisors and authorities
  - Technical + institutional solutions for efficient water use (irrigation)
  - Social benefits when farmer water groups work together

Involving irrigation farmers mobilizes their local knowledge and their creativity for additional or better solutions.