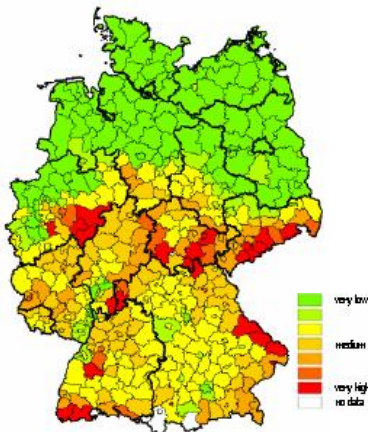


Soil erosion in Germany: precautionary measures and their implementation

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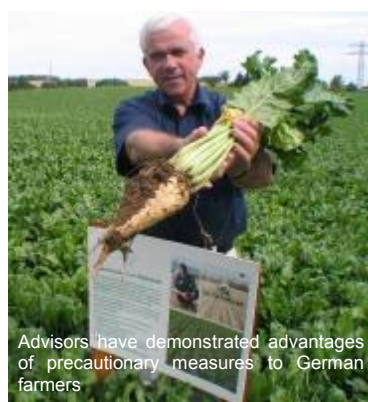
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Water erosion risk for German districts (Erhard et al. 2002)



Sugar beet sowing after conservation tillage in Kraichgau (Southern Germany)



Advisors have demonstrated advantages of precautionary measures to German farmers

Erosion on sugar beet fields

Soil erosion is linked to soil cultivation, but its actual causes are rain and wind. Erosion leads to on-site effects on fields and off-site effects in neighbouring ecosystems and housing estates downstream from eroded area. Although with low significance for whole Germany some regions are at a high erosion risk. Sugar beet fields are very prone to erosion due to the following: Land for beet growing often remains bare until spring. Sugar beet is sown in March or April and has wide row spacings. Because of a slow juvenile growth it takes about two months until canopy closure. Hence, water and wind can affect soil for a long term.

Significance and determining factors

The risk for **water erosion** averaged 4.2 t soil ha⁻¹ in German surveys for 1999, but large regional differences exist. Factors influencing potential erosion are amount and intensity of rainfall, topography, soil texture, humus content and land use. The actual risk is determined by soil cover (mulch or plants), water infiltration, aggregate stability and soil moisture content.

Wind erosion reaches a notable significance only on sandy and peaty soils in Northern Germany. The mean soil loss amounts e.g. 0.43 t ha⁻¹ a⁻¹ at a site with high risk. Determining factors are wind direction and speed, topography, open landscape, surface roughness, soil texture, humus content and cover.

Precautionary measures

German sugar beet farmers have introduced the following precautionary measures for more than 20 years:

- Ø Soil liming to conserve aggregate stability
- Ø Catch crops to cover soil during winter
- Ø Conservation tillage with mulch of a catch crop or straw
- Ø Considering slope length and gradient concerning landscape management
- Ø Ploughing sandy soils in spring
- Ø Windbreaks (hedges) in areas with risk for wind erosion

A combination of different methods is most effective to reduce negative environmental impacts of sugar beet production and improve economical results positively. Additionally, farmers meet the demands as stated in German Soil Protection Act to prevent soil losses through a site specific management. In this way sugar beet cultivation fulfils the requirements of sustainable development.

Implementation into practice

Farmers and researchers have developed and improved methods to prevent erosion. The transfer from knowledge into practice has to be performed by a trustworthy and engaged agricultural advisory service. German advisors have helped farmers to implement precautionary measures into beet growing in the following ways:

- Ø Informing farmers about cost reductions and environmental benefits especially soil protection
- Ø Organizing field days to show practical suitability of measures
- Ø Publishing articles in agricultural journals promoting the advantages
- Ø Cooperating with scientific institutions to optimize measures and technology (e.g. field emergence and weed control)

Today, precautionary measures are very disseminated throughout Germany: Sugar beet are sown into mulch of a catch crop or straw on 26 % of the area. The significance of conservation tillage is higher than 50 % in some regions and many farmers even work only in this way.