

SEELAND

Context and objectives

After the first and the second correction of the rivers and lakes in the Jura region, the Seeland became one of the most important agricultural areas in Switzerland. The Seeland used to be covered by swamps and ponds. Physical and chemical conditions were favourable to peat formation. In the context of the corrections, soils were drained and exposed to ambient air, triggering an important loss of soil through oxidation. The mechanical and chemical erosion processes resulted in a significant subsidence of the terrain.

The groundwater level controls the rate of chemical erosion. On the one hand, there is need to keep the water table high to prevent/slow down the oxidation of organic soils. On other hand, in the context of climate change, groundwater is increasingly used for irrigation potentially leading to a drawdown of the water table. At the same time, the water table affects the irrigation water demands. Controlling the water tables in the Seeland aquifer through the existing drain age network is thus the key to a sustainable management of the soil- and water resources.

The CHYN is involved in several research projects in the Seeland related to water – and soil resources management.

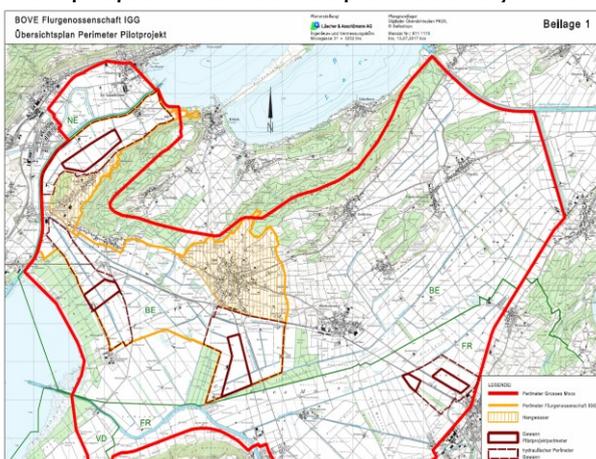
Research approach and methodology

Depending on the interest of the student, a wide range of activities and investigations can be carried out, including the following:

- Assessment of the potential to use the drainage-nets for means of irrigation. This is an interesting approach because the loss of soil resulted in a much higher installation level of the drains. Targeted experiments to measure the response of the aquifer to blocking the drains can be carried out in the field.
- Development of a numerical model simulating irrigation, infiltration and transpiration dynamics: Such a model can be based on available data. Targeted field experiments to inform the model should be developed and carried out
- Analysis of the influence of topography and the hydraulic properties of the soil on water logging in the agricultural fields. Understanding water logging processes is central to planned modifications of the topography of waterlogged areas. In this context, the influence of groundwater dynamics on soil moisture profiles will be assessed through a combination of numerical models based on geophysical data and additional field campaigns.

Partners and collaboration

The project will be supervised by Prof. P. Brunner, Prof. D. Hunkeler and F. Miville.



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