

# Modelling N leaching from vegetable fields in Switzerland

**Starting date:** 1 July 2026 or later

**Duration:** 6-12 months

**Working Place:** Zurich Reckenholz

**Language:** English, German

**Agroscope research group:** Water protection and substance flows

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## Project description

Field-grown vegetable systems are often associated with high nitrogen (N) inputs and elevated risks of nitrate leaching, particularly under temperate climatic conditions such as those found in Switzerland. Compared to arable crops, vegetables frequently have shallow root systems, short growing cycles, and high nitrogen demand, which can result in periods where mineral nitrogen remains unused in the soil. Combined with frequent irrigation and precipitation events, this residual nitrogen can be readily leached below the root zone, posing a risk to groundwater quality.

Reliable assessment of nitrogen leaching from vegetable production therefore requires robust, process-based modelling approaches that can capture interactions between crop growth, soil water dynamics, and nitrogen cycling. However, model performance strongly depends on the quality of crop parameterization, which remains limited for many vegetable species. High-resolution lysimeter measurements offer a unique opportunity to quantify water and nitrogen fluxes and to improve crop parameter sets under realistic field conditions. Improving vegetable crop parameterization in the DAISY model is thus essential for more accurate simulations of nitrogen leaching and for supporting sustainable nutrient management and environmental protection strategies in Swiss agriculture.

## Main tasks

- Review of existing DAISY crop parameterizations for vegetable crops
- Preparation and analysis of lysimeter datasets (water, nitrogen, biomass where available)
- Calibration of vegetable crop files in DAISY
- Model evaluation against observed lysimeter measurements
- Sensitivity analysis of key crop parameters

