

# Project summary

## Development and Field Application of a Throughfall Exclusion System to Induce Water Stress in Maize

### Background:

Besides grassland, maize is the most important forage crop in Switzerland as nearly 12% of arable land is under silage maize cultivation. At present, limited water availability between flowering and grain filling is the main limitation for maize production (Holzkämper et al., 2015). Since rainfall during summer is projected to decrease by up to 30% (Fischer et al., 2014), we expect water shortage to become decisive for maize production in the near future.

To test the impact of management on the resilience of maize to water shortage, water stress needs to be induced *in situ*. Rainout shelters have commonly been used to reduce rainfall but their influence on the canopy's microclimate and material requirements make them unsuitable for field experiments in maize. Hence, we aim to develop a throughfall (rainfall minus stemflow) exclusion system (Zheng et al., 2019) that is implemented near the soil surface between maize rows to partly intercept rainfall while at the same time maintaining a natural microclimate.

### Aim:

The aim of this master project is the development of a near-surface inter-row throughfall exclusion system and the evaluation of its efficiency to simulate water shortage under field conditions. Crop development and performance as well as soil and plant water status are to be monitored during the growing season by different techniques.



We are seeking a candidate with background in agronomy, ecology, or environmental sciences, who has a strong interest in field work and technical development.

**Beginning:** 01.04.2021 or by arrangement  
**Duration:** 6 months  
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Holzkämper, A., Fossati, D., Hiltbrunner, J., & Fuhrer, J. (2015). Spatial and temporal trends in agro-climatic limitations to production potentials for grain maize and winter wheat in Switzerland. *Regional Environmental Change*, 15(1), 109-122.

Fischer, A. M., Keller, D. E., Liniger, M. A., Rajczak, J., Schär, C., & Appenzeller, C. (2015). Projected changes in rainfall intensity and frequency in Switzerland: a multi-model perspective. *International Journal of Climatology*, 35(11), 3204-3219.

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