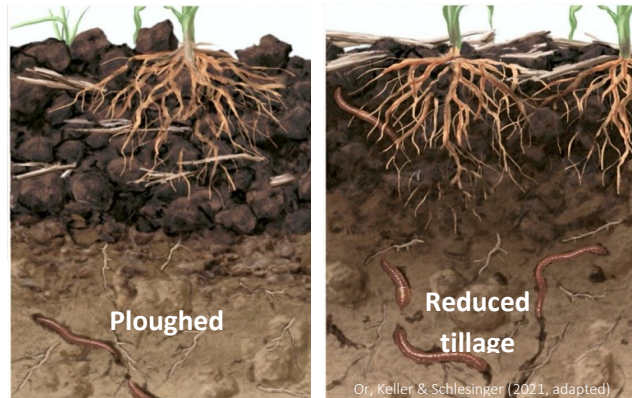


BSc- oder MSc-Thesis

Climate smart soil management

Agricultural soils must cope with climatic extremes in order to fulfill important functions such as food production or the storage and filtering of water (Hamidov et al., 2018). A central role in this is played by soil structure, which determines properties such as water infiltration or soil water retention. Soil structure, in turn, is continuously altered by agricultural soil management practices (Or et al., 2021). Soil organisms and roots, as well as tillage, loosen the soil, while mechanical stress compacts the soil



Within the project "Soil management for enhanced climate resilience" the effects of soil management practices and systems on soil-water balance and agricultural production are being investigated. For this purpose, measurements in long-term experiments are combined with modeling to make statements about the benefits of adapted soil management in current and future climates. For the modeling, the newly developed model BODIUM (König et al., 2023) is used, which distinguishes itself from other models by the dynamic implementation of soil structure.

Within the framework of the project, various types of work can be written. The following options are possible:

- Literature review on the influence of soil management practices and strategies on the water balance of agricultural soils.
- Field and laboratory measurements of hydrological and mechanical soil properties in long-term field experiments.
- Utilization of mechanistic plant-soil models to predict the long-term effects of soil management practices on soil and important ecosystem services.
- Working on a self-chosen research question in the mentioned subject areas.

Rahmenbedingungen

Requirements:	We are looking for one or more candidates with a background in agricultural or environmental sciences (or comparable) and an interest in agricultural soil management. The project can be carried out by several people working in collaboration.
Beginning:	At any time, lead time of approx. 2 months desired.
Duration:	3-12 Monate oder nach Absprache
Contact:	Olivier Heller, olivier.heller@agroscope.admin.ch Agroscope, Soil Quality and Soil Use, Reckenholzstrasse 191, 8046 Zürich

References

- Hamidov, A., Helming, K., Bellocchi, G., Bojar, W., Dalgaard, T., Ghaley, B. B., ... & Schönhart, M. (2018). Impacts of climate change adaptation options on soil functions: A review of European case-studies. *Land degradation & development*, 29(8), 2378-2389. doi: 10.1002/ldr.3006.
- König, S., Weller, U., Betancur-Corredor, B., Lang, B., Reitz, T., Wiesmeier, M., ... & Vogel, H. J. (2023). BODIUM—A systemic approach to model the dynamics of soil functions. *European Journal of Soil Science*, 74(5), e13411. doi: 10.1111/ejss.13411
- Or, D., Keller, T., & Schlesinger, W. H. (2021). Natural and managed soil structure: On the fragile scaffolding for soil functioning. *Soil and Tillage Research*, 208, 104912. doi: 10.1016/j.still.2020.104912.