



The Eco-serve project - Agriculture in a changing climate

The temperature of the Earth is going up, leading to extreme weather, with more heavy rain spells and more heat waves. The consequence may well be lower production of our most important crops. The Eco-serve project investigates the interaction between cropping systems, plant species, soil and soil organisms to understand how we can make agricultural land hold water better when it's dry, or allow more water in soil when it's wet and still provide sufficient nutrients. Stakeholder interactions will be instrumental to assess the feasibility of proposed management alternatives.

Interactions between crops, soil life and soil processes

We think that organic matter management is crucial in reaching our goals. There is a broad understanding that it is important to maintain the humus content of agricultural land in order to conserve water and nutrients, and get high and stable yields. We therefore investigate organic matter additions under manipulated flooding and drought to examine how different agricultural soils react to a changing climate. For that purpose we use different crops and crop varieties that produce different types of litter. This will have characteristic effects on soil life that influence the physical (soil structure and water retention) and chemical (nutrient retention) conditions in soil that ultimately affect crop production.



Agriculture is exposed to a changing climate (France)

Experiments with soils from different parts of Europe

In Europe we find strong climate gradients from North to South and from East to West. Agriculture in all parts of Europe is affected by the changing climate, but the effects vary depending on where in Europe a farm is situated. Eco-serve research partners in Portugal, France, Spain, the Netherlands, Switzerland and Sweden together examine how agricultural soils in their countries are affected by changes in rainfall.



Collection of intact soil cores for the Climate Chamber Experiment (Portugal)

To complement this work, a joint experiment with intact soil cores from Portugal, France and Switzerland is carried out.

Climate experiment

In a climate chamber, the soil cores are exposed to different rainfall and drought conditions. Decomposition of various types of plant material is compared to assess effects of litter decomposition on soil moisture, nutrient content, nutrient leaching and plant growth and how this is affected by soil life.



Harsh conditions in the French alpine meadows



From climate chamber to practice

We analyze how different farming types and supply of various types of plant material affect how agricultural soils respond to increased drought, rain or fluctuations in rainfall in further greenhouse and field experiments. We also compare how the local soil biotic community breaks down locally produced litter compared to litter from other fields. Data from the trials will be discussed with farmers, advisors and other interested parties to evaluate which methods can be used for climate adaptation of agriculture in practice.



Soil cores in the field (Switzerland) and in the climate chamber (Portugal)



Rainy field work in the Netherlands

