

# SOIL management to mitigate climate change-related precipitation eXtremes (SoilX)

November 2022 – October 2024



EJP SOIL has received  
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Union's Horizon 2020  
research and innovation  
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# SoilX researchers



# Background

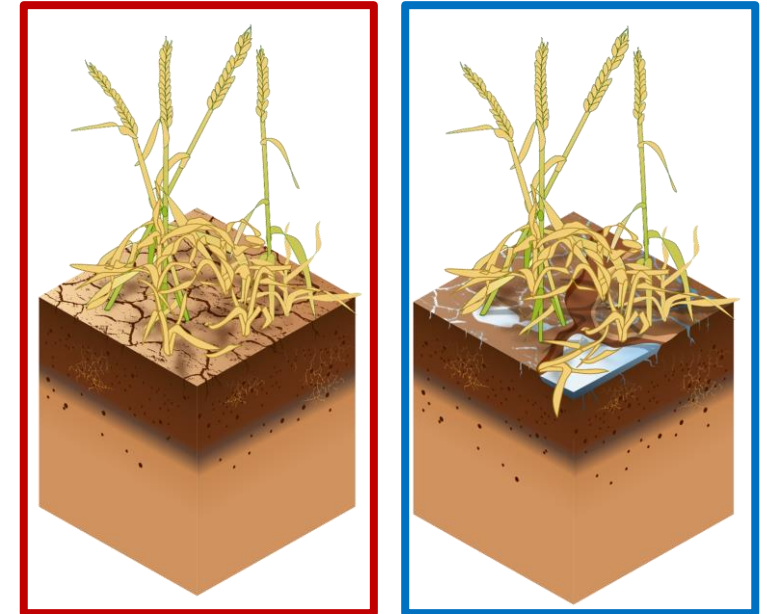
Extreme weather: drought & flooding

1. are problematic, and;
2. become more frequent with climate change.

Need for climate adaptation: improve soil hydrological functioning.

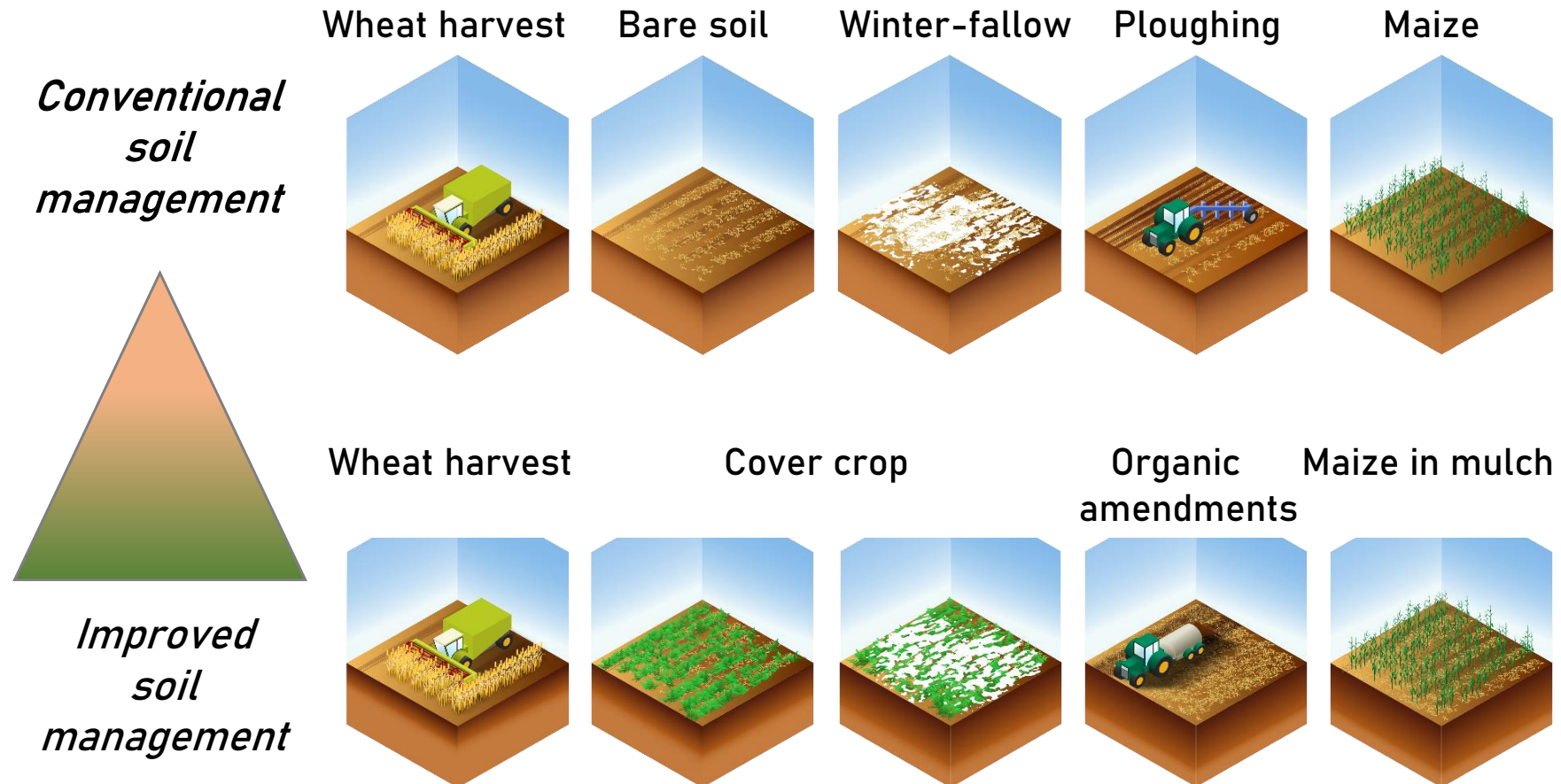
CLIMASOMA meta-analyses, EJP-Soils 2021 :

1. retaining green cover, and;
2. addition of organic material are particularly beneficial.



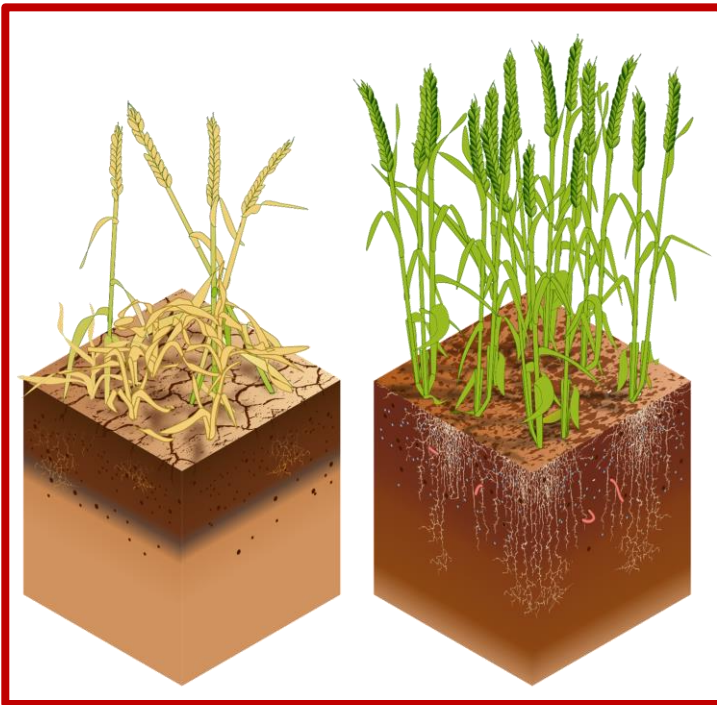
# SoilXs hypotheses

## 1. Improved soil management practices increase soil carbon input



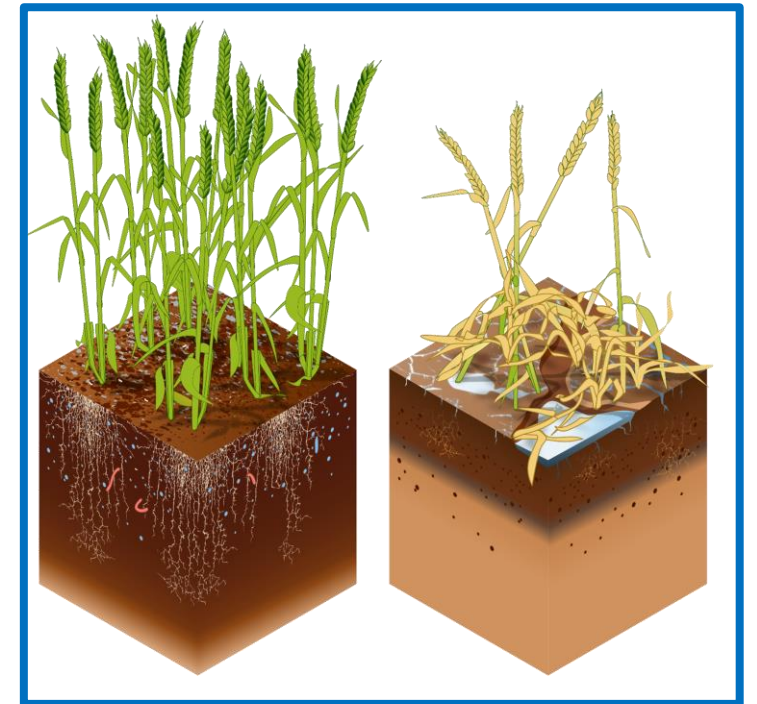
# SoilXs hypotheses

1. Improved soil management practices increase soil carbon input;
2. Improved soil management creates favourable soil structure that improves soil hydrologic functioning.



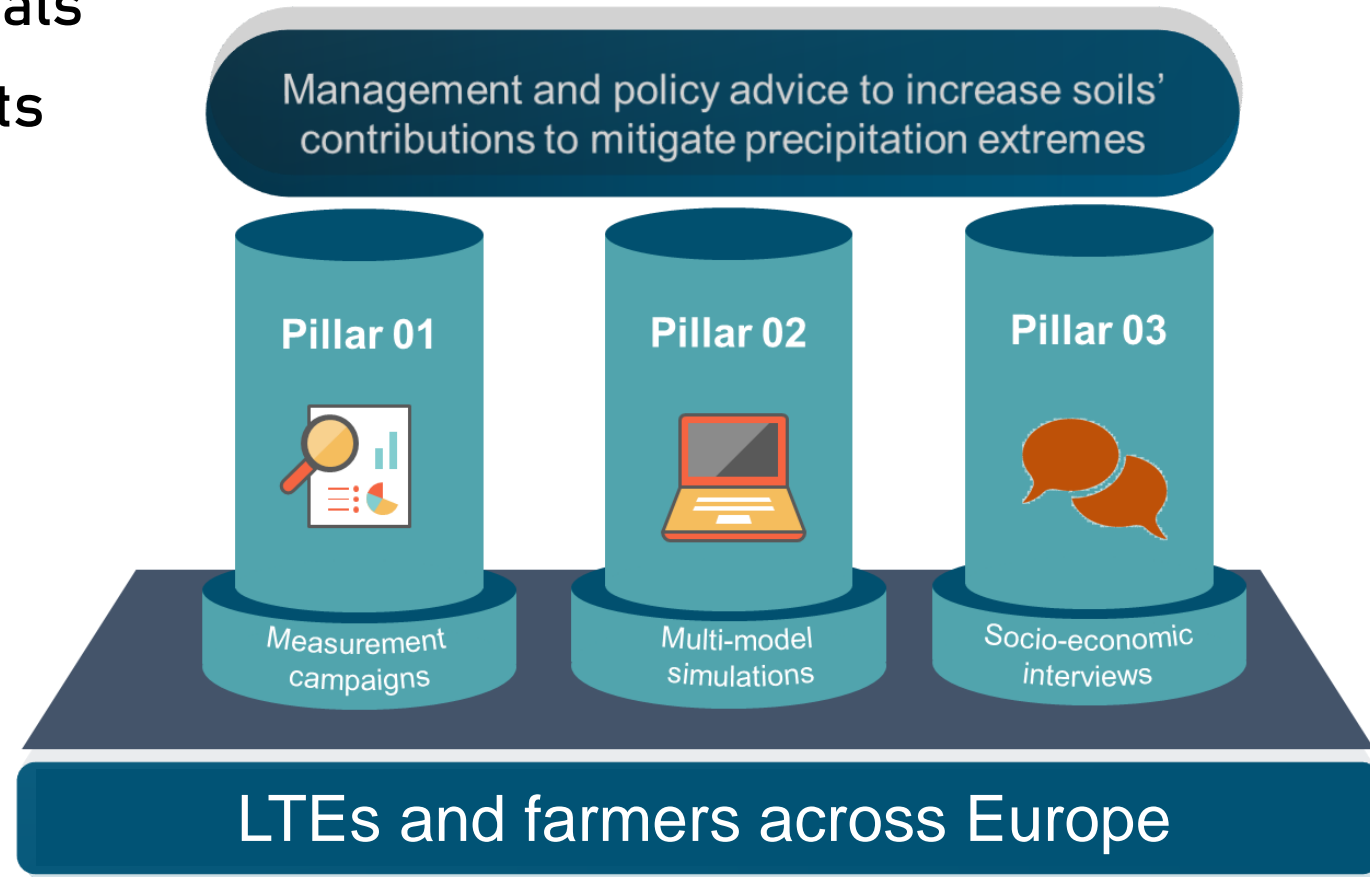
During drought:  
increased plant-  
available water

During heavy  
rain: reduced  
runoff and  
improved water  
retention



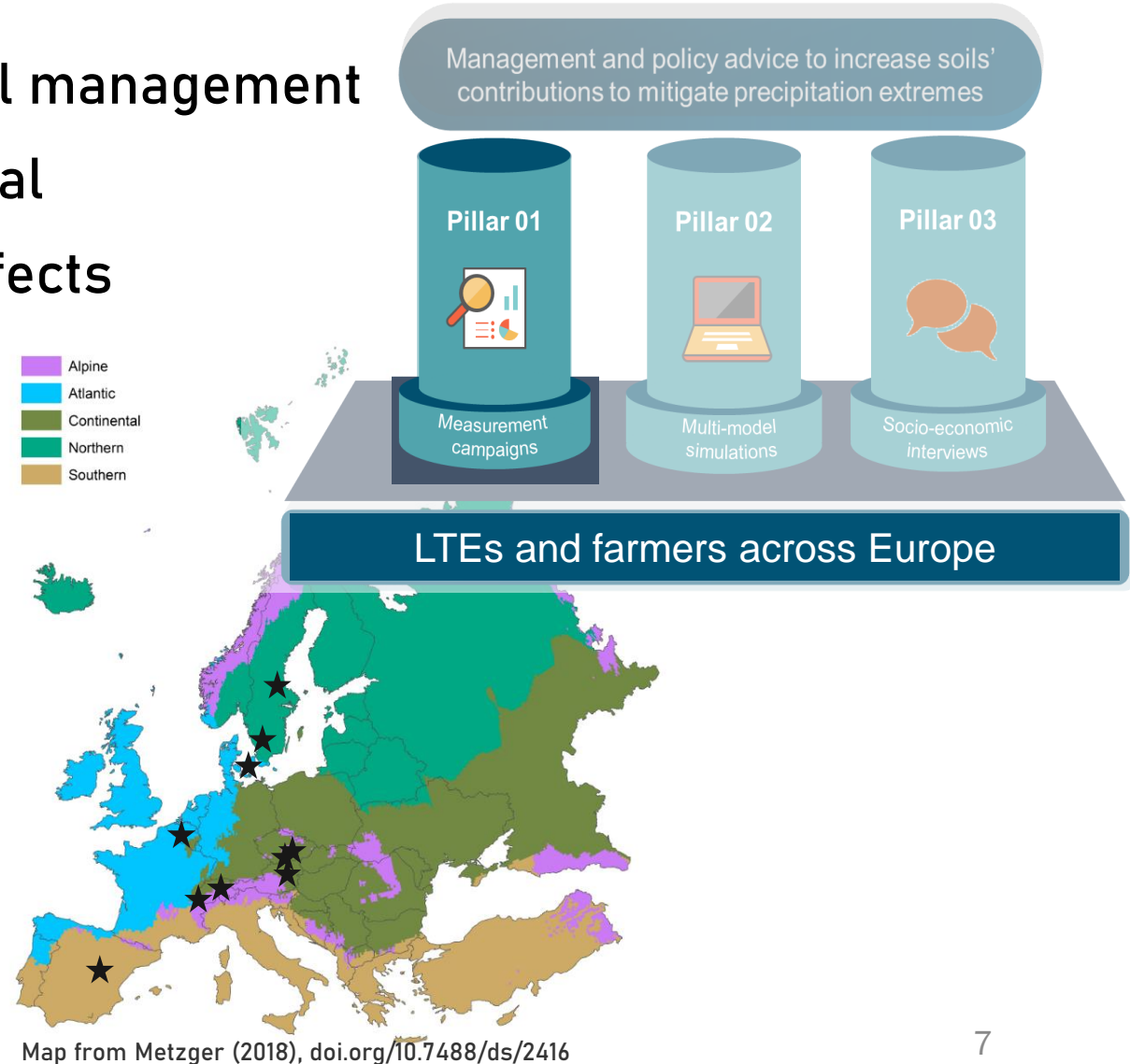
# Research aim and approach

To evaluate region-specific potentials of soil management improvements to benefit climate adaptation.



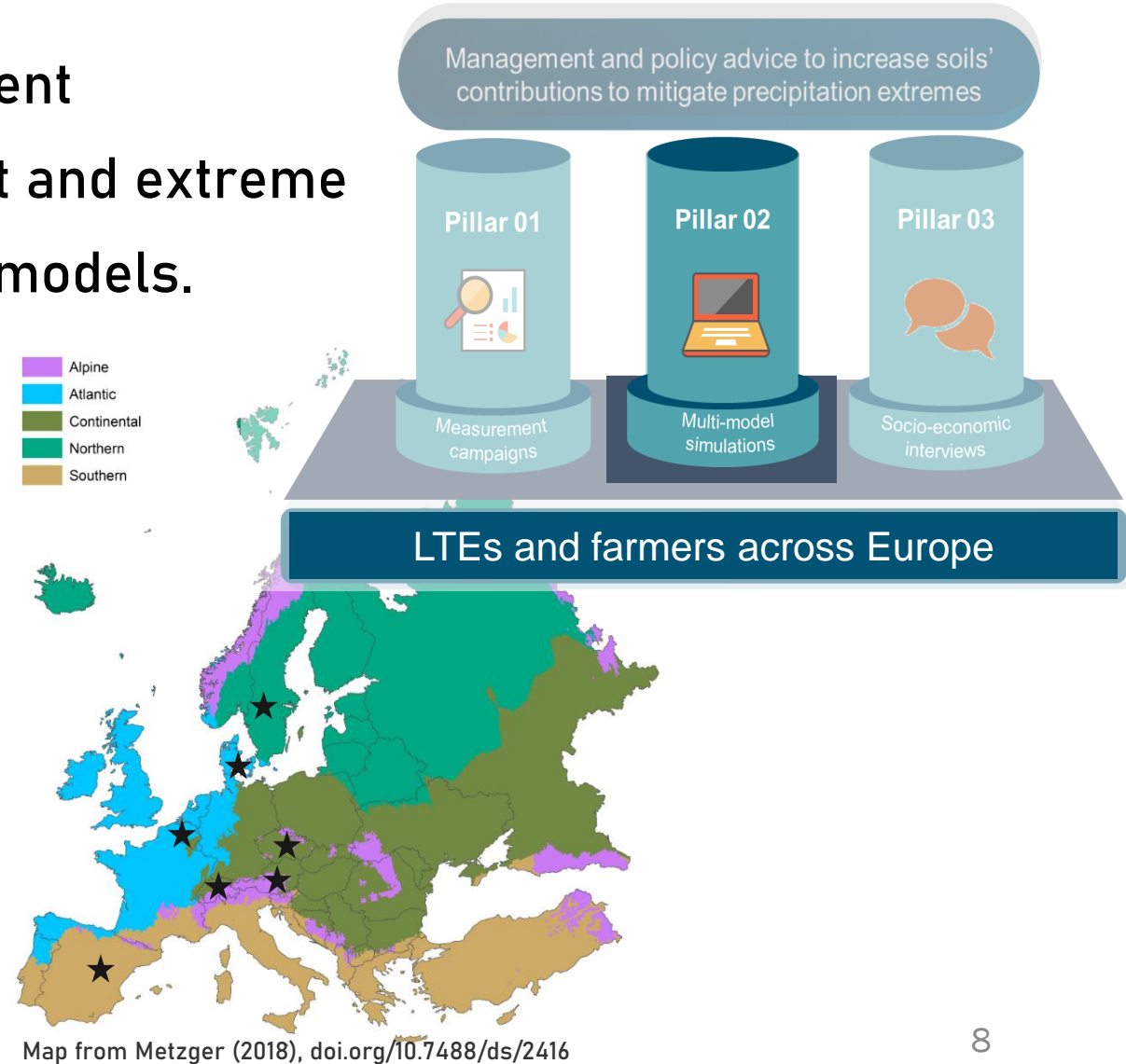
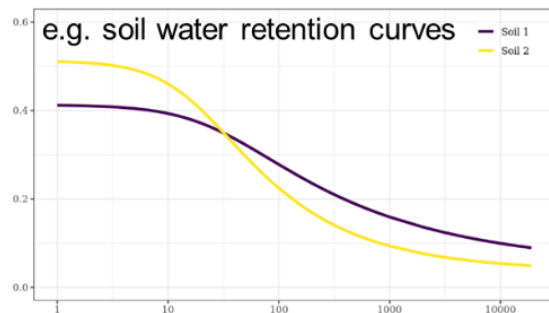
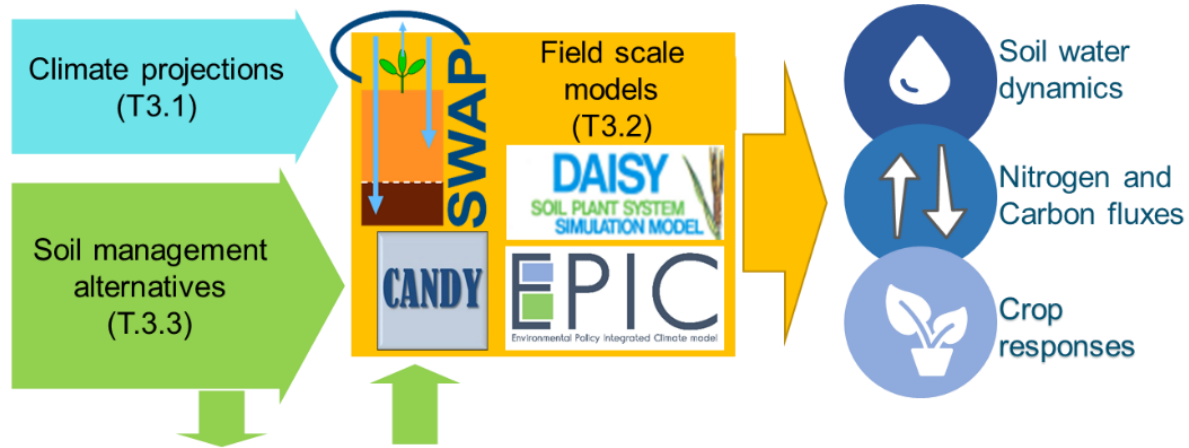
# Pillar 1. Measurement campaigns

Assessment of long-term impacts of soil management on soil physical, hydraulic and mechanical properties to provide evidence on the effects of soil management improvements.



# Pillar 2. Multi-model simulations

Evaluation the benefits of soil management improvements to mitigate future drought and extreme precipitation using different biophysical models.

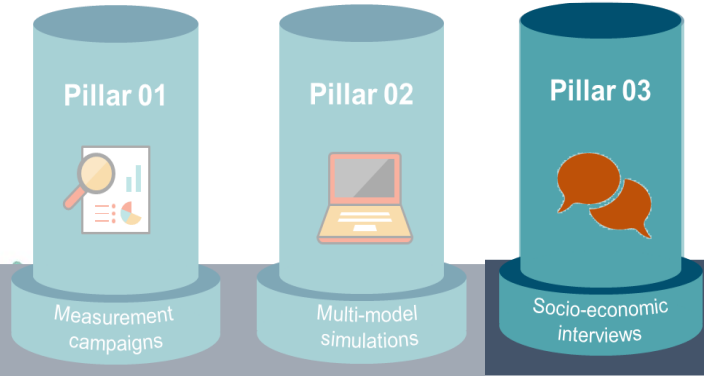




# Pillar 3. Socio-economic interviews

Investigating crop farmers' perspectives on soil management practices through interviews to identify enabling factors for the uptake of improved soil management practices.

Management and policy advice to increase soils' contributions to mitigate precipitation extremes

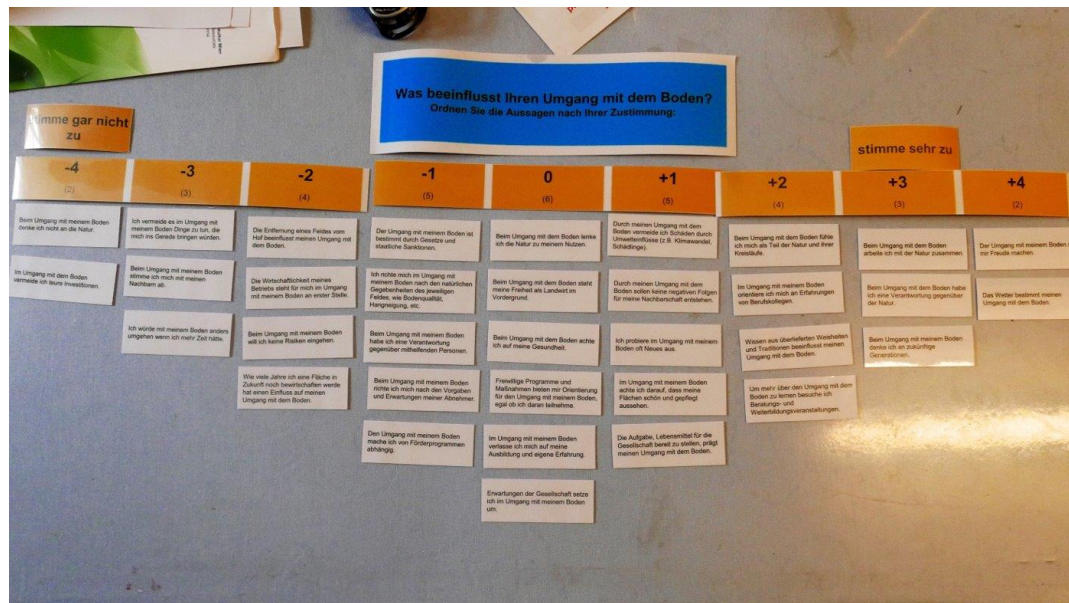


LTEs and farmers across Europe

- Alpine
- Atlantic
- Continental
- Northern
- Southern



Map from Metzger (2018), doi.org/10.7488/ds/2416



# Expected questions answered

1. How did soil management affect soil hydraulic properties in long-term field experiments across Europe?
2. To what extent can soil structural improvements enhance the resilience of cropping systems to future precipitation extremes?
3. Which socio-economic factors enable soil management improvements?





# Knowledge gaps addressed

1. Limited evidence of soil management effects on soil physical, mechanical and hydraulic properties and associated impacts on crop-water supply and productivity;
2. Lack of systematic analyses of spatio-temporal variation in soil management-related adaptation benefits and mitigation/sustainability co-benefits or trade-offs;
3. Lack of understanding of context-specific enabling and hindering factors that drive adaptation of improved soil management practices.