

BLOCK C (14:00-15:45)

Sustainable soil management

Involved projects:

SoilCompaC, SCALE, SoilX

Conveners:

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Session text:

Sustainable soil management requires consideration of the multifunctionality of agricultural landscapes, in which the management of natural resources may be in conflict with environmental and socio-economic demands. The need for efficient, climate-smart and environmentally-friendly production of safe, high-quality agricultural products that benefit the social and economic conditions of the farmers and local communities, places high demands on soil functions and soil management. Furthermore, the challenges presented by climate change with projected increases in the occurrence and severity of extreme events, add complexity to achieving sustainable soil management. The multiple land uses and involvement of multiple stakeholders require an integrated approach between policy and practice to maintain or improve sustainable soil management.

Strategies for sustainable soil management aim at, among others, the prevention and mitigation of soil compaction, minimisation of soil erosion and improvement of soil water retention and infiltration capacity. While measures to achieve these strategic goals are generally known, a deeper understanding is needed on extents of sustainability gains as well as possible trade-offs with different sustainability targets in regional European contexts.

The already acute threat of soil compaction is expected to worsen in the future due to the continued trend towards heavier machinery and effects of climate change. Despite the well-documented negative consequences of compaction on key soil functions, there is limited data of the spatial extent, distribution and severity of soil compaction. Moreover, detailed information on the risk of soil compaction, as well as its impacts on key soil functions such as productivity, climate regulation and water cycling in a context of climate change is lacking. Therefore, obtaining a better knowledge of these questions is crucial for a better guidance of sustainable soil management and alleviation of soil compaction today and in future climate.

In the context of soil erosion, on-site soil management of agricultural fields also has potential off-site impacts. Water and sediment transport from agricultural fields to other landscape elements such as water courses or infrastructure depends both on soil management and the connectivity within the landscape. Additional knowledge of surface processes at multiple scales and across landscape elements is needed. Through modelling of soil erosion processes and the implementation of mitigation measures, the effects of soil erosion by water can be mitigated by increasing the focus on water and sediment connectivity in the landscape.

Measures such as cover cropping, organic amendments and reduced tillage are expected to benefit soil water retention and thus mitigate drought stress in cropping systems. Evidence of these benefits however is very limited. Furthermore, it is largely unknown to what extent such measures could mitigate future drought and precipitation extremes. Even when some measures may be more effective than others, they may not be equally acceptable for farmers. To enable transitions towards more sustainable soil management, possible inhibitors need to be identified and addressed through adjustments in governance.

In this session, we focus on sustainable soil management, especially in regard to these three themes and we kindly invite interested parties to submit an abstract with results of their novel research.