

Soil C-sequestration and the related trade-offs

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The improvement of soil carbon (C) sequestration while reducing GHG emissions is a strategic target to mitigate climate change in agricultural lands. This can be pursued through a large range of management strategies, including minimizing soil disturbance, diversification of crop rotations, use of cover crops, incorporation of crop residues, addition of organic amendments, rewetting of organic soils, etc. Further, the increase of soil organic carbon stocks has a variety of co-benefits, beyond climate change mitigation, including improvement of soil health, fertility and water holding capacity. However, the environmental context, including biotic (biodiversity, microbial activity, crop type, etc.) and abiotic (soil physical and chemical properties, climate, etc.) factors can strongly shape the balance between C sequestration, CO₂, N₂O and CH₄ fluxes, and N leaching. For instance, in cultivated peat soil warming is expected to intensify organic matter degradation and further reduce C-sequestration, while contributing to GHG release. In more arid environments, the application of organic amendments can improve carbon sequestration while impacting the GHG fluxes.

In this session, we welcome contributions that give insights into how soil management influences C sequestration rates and non-CO₂ GHG fluxes in agricultural lands. We welcome experimental, modelling or synthesis approaches addressing the causes and mechanisms of the observed trade-offs and/or synergies between GHG release and soil C sequestration. The session will be convened by scientists participating in projects within the European Joint Programme Cofund on Agricultural Soil Management