



What can we learn from field experiments about the development of SOC and GHG emissions under different management practices?

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Successful agricultural management practices are required to maintain or enhance soil quality; at the same time climate change mitigation is becoming increasingly important. Within the EU project CATCH-C we analysed the effects of different agricultural practices not only on crop productivity, but also on soil quality indicators (e.g. soil organic carbon (SOC)) and climate change (CC) mitigation indicators (e.g. CO₂, CH₄, N₂O emissions). European data sets and associated literature, mainly from long-term experiments were evaluated. This evaluation of agricultural management practices was carried out comparing a set of improved (“best”) and often applied (“current”) management practices.

Positive and negative effects occurred when best management practices are adopted. As expected, none of the investigated practices could comply with all objectives simultaneously, i.e. maintaining high yields, mitigating climate change and improving chemical, physical and biological soil quality.

The studied soil management practices “non-inversion tillage”, “organic fertilisation” (application of farm yard manure, slurry, compost) and “incorporation of crop residues” represent important management practices for farmers to increase SOC, thus improving soil quality. However, CO₂ and, especially, N₂O emissions may rise as well.

The evaluation of CC mitigation is often limited by the lack of data from – preferably - continuous GHG emission measurements. Thus, more long-term field studies are needed to better assess the CO₂, CH₄ and, especially, N₂O emissions following the above mentioned favorably rated MPs. Only if SOC and GHG emissions are measured in the same field experiments, it will be possible to compute overall balances of necessary CO₂-C equivalent emissions.

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