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Effects of agricultural management on productivity, soil quality and climate change mitigation - evaluations within the EU Project (FP 7) CATCH-C

Heide Spiegel (1), Norman Schlatter (1), Hans-Peter Haslmayr (1), Andreas Baumgarten (1), and Hein ten Berge (2)

(1) Austrian Agency for Health and Food Safety, Institute for Sustainable Plant Production, Department for Soil Health and Plant Nutrition, Vienna, Austria (adelheid.spiegel@ages.at), (2) Wageningen UR, Plant Research International B.V., AP Wageningen, the Netherlands (hein.tenberge@wur.nl)

Soils are the main basis for the production of food and feed. Furthermore, the production of biomass for energy and material use is becoming increasingly important. Goals for an optimal management of agricultural soils are, on the one hand, the maintenance or improvement of soil quality and, on the other hand, high productivity and climate change mitigation (reduction of GHG emissions and C sequestration). Thus, the EU project CATCH-C aims to evaluate current management practices concerning these three goals based on indicators derived from long-term field experiments of the project partners and from literature data.
A maximum of 72 indicators for productivity, soil quality and the potential for carbon storage in the soil and the reduction of greenhouse gas emissions were selected by the project partners. As indicators for productivity, crop yields are determined in almost all field trials. The content of soil organic carbon (SOC) is an indicator for chemical, physical and biological soil quality and was analysed in the topsoil in all field trials. Less data exist for SOC contents in the subsoil. An important physical soil quality indicator is the bulk density, however, it is not determined in all field trials of the project partners. Therefore, information on SOC stocks, with relevance to carbon storage and climate change mitigation, is not available in all field experiments. Other physical indicators, such as penetration resistance, runoff coefficient and soil losses are evaluated. Essential biological indicators are microbial biomass and the number and weight of earthworms, which have been tested in several field trials. The evaluation of all these indicators will help to select “best management practices” and to address trade-offs and synergies for all indicators under consideration of major European farm type zones.

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