

Abstract World Congress of Soil Science 2022

Session: #2 Soil Carbon: From particle to planet.

Hanegraaf M.C., Vervuurt W., Jansen S., Olijve A.J., Van de Berg, W., De Haan, J.

Grounds for assessing regional reference values for organic carbon contents in soil

Although soil organic carbon (SOC) levels are considered important for agriculture production and climate change, reference values for SOC and/or related indicators are poorly defined. We hypothesize that indicators for active and/or stable SOC fractions show regional differences in relation to carbon storage. Data were collected within a farmers' network of 16 arable farms on mineral soils throughout The Netherlands. In autumn 2019, samples of 32 fields were analysed for organic carbon (Kurmies), Hot Water Exchangeable Carbon (HWC), permanganate-oxidizable carbon (POXC) and the I- and R-index following Rock Eval pyrolysis. Details of soil and farm management over the period 2010-2019 were collected, and additionally, regional statistics. The RothC-model was used for modelling carbon storage. In 2019, SOC-contents in the fields ranged from 1.1 to 4.8 g.kg⁻¹, HWC from 214 to 824 mg.kg⁻¹ and the I/R-ratio from -0.165 to 0.365. For sandy soils, a north-south gradient was shown for SOC- and HWC-contents. The I/R-ratio decreased in the order sandy > löss > old clay > young clay soils, indicating differences in organic matter lability. During the decade, additions of organic matter had increased in all fields. Modelling results however indicate decreasing SOC-trends in 26 fields. Upscaling to the regional level revealed that regions may differ in risk of SOC decline. Tentatively, the conclusion is that regional references for SOC indicators alone do not suffice for evaluating soil quality. It is recommended that sets of agro-ecological indicators are developed, including SOC fractions and soil management, and relative to regional weather conditions.