

BASIC PRINCIPLES FOR SAMPLING AND REPORTING FOR STUDIES INVOLVING THE MEASUREMENT OF CARBON SEQUESTRATION IN SOILS

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Variation in soil organic carbon (SOC) levels due to differences in soil management has been the subject of much investigation over the past decades. More recently, growing concerns relating to the consequences of increasing carbon dioxide levels in the atmosphere have intensified a focus on carbon (C) sequestration in soils. In the plethora of scientific papers emanating from investigations of this kind, a lack of uniformity in terms of sampling methodologies and reporting units detracts from the usefulness of the acquired data. In this paper, we review briefly the order of magnitude in which atmospheric C is fixed above ground and in the soil for four types of agricultural land use (sugarcane, sugar beet, cereals and plantation forestry); as well as the basic principles for a correct appraisal of organic carbon and for reporting on differences in SOC. These include (i) expressing C in mass per unit of surface up to a depth of at least 60 cm, (ii) listing of the typological characteristics of the soils, and (iii) sampling of the different soil horizons by taking into account the natural existing lateral variation in their characteristics and avoiding the mixing of soil material coming from different horizons. Because soil organic matter includes fractions with a relatively quick turnover rate as well as ones with a very slow mineralization rate, the fraction of SOC that should be considered as "fixed" atmospheric CO₂ is evoked in the last part of this paper. In a final paragraph the question "which fraction of the crop residue may be used for energy production without compromising the capacity of the soil to stock organic carbon" is also evoked.

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