How scale influences the effectiveness of sampling strategies for soil organic carbon – a review

Brian Murphy (1) and Aaron Simmons ()
(1) Australia (brian.amaroo@bigpond.com), (2) aaron.simmons@dpi.nsw.gov.au

How scale influences the effectiveness of sampling strategies for soil organic carbon – a review
Brian Murphy1 and Aaron Simmons2.

1 Honorary Scientific Fellow, New South Wales Office of Environment and Heritage, Cowra, NSW 2794, Australia
brian.amaroo@bigpond.com
2 Technical Specialist, Climate Mitigation. Orange Agricultural Institute, New South Wales Department of Primary Industries, Orange. NSW, Australia.

The spatial distribution of soil organic carbon (SOC) is controlled by a number of factors and these vary with scale. At finer scales at the plot and field scale it can be difficult to identify the specific factors influencing the spatial distribution of SOC, so more reliance is placed on design based sampling patterns. At the regional scale, climatic and soil based variables such as parent material begin to have a strong effect on the spatial distribution of SOC, so model based sampling patterns become more reliable and effective. The purpose and scale of the estimates required from the measurements of SOC will determine the effectiveness of different sampling patterns and procedures. A brief summary of the relationships between the scale and purpose of sampling for SOC and the sampling patterns and methodology is presented. In general, it is apparent that model based sampling patterns can be the most effective at the regional and broad scale while design based sampling patterns can be most effective at the plot and field scale. At more intermediate scales such as the farm and soil landscape scale, there is a mixture of results because this is in a transition zone where environmental variables such as climate and soil related variables (eg terrain) begin to have an influence on the spatial distribution of SOC.