North Wyke Farm Platform

Case study no. 25

The Carbon Footprint of Beef: Soil Organic Carbon

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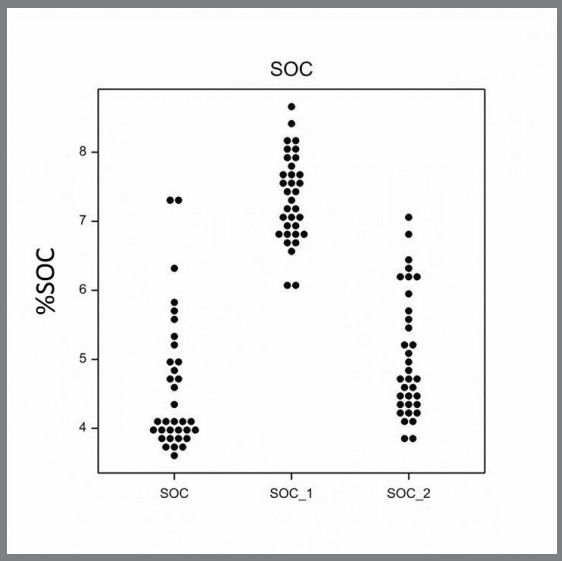
More than 60 million tonnes of beef are produced globally every year. Demand is increasing with dietary shifts and population growth. Beef production is responsible for 41% of total agricultural CO_2-eq emissions.

Soil organic carbon (SOC) is an important factor for both carbon storage and maintaining soil fertility. It is believed that tillage reduces SOC as it exposes the soil to more oxygen which accelerates the rate at which the microbial biomass turns it over and produces CO_2. It is estimated that soils have the potential to sequester around 0.9 Pg of carbon per annum, enough to offset 13% of all CO_2 from anthropogenic sources.

The North Wyke Farm Platform (NWFP) is comprised of three hydrologically isolated "farmlets" with different pasture-based livestock systems, indicative of UK grazing systems: the "red" system based on high sugar ryegrass; the "green" system based on a permanent pasture; and the "blue" system based on increased clover. Each farmlet is grazed by separate herds of 30 cattle (n = 90).

34 soil samples were taken in June 2014 from the top soil horizon (3 cm x 7.5 cm depth) using GIS mapping of each of three catchments: 2 (red farmlet), 5 (green farmlet) and 8 (blue farmlet)

The soils were analysed for bulk density, SOC by loss-on-ignition, and total C by elemental analysis.



SOC was considerably greater in the top soil of the permanent pasture.

GIS mapping of the data demonstrated considerable spatial variability within the fields.

SOC concentrations was linked to the catchment aspect (slope and water erosion) and management history.