

Assessing Vertical Distribution of Soil Organic Carbon Stocks in Westleigh Soil under Shrub Encroached Rangeland, Limpopo Province, South Africa

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Abstract : Accurate quantification of the vertical distribution of soil organic carbon (SOC) in relation to land cover transformations, associated with shrub encroachment is crucial because deeper lying horizons have been shown to have greater capacity to sequester SOC. Despite this, in-depth soil carbon dynamics remain poorly understood, especially in arid and semi-arid rangelands. The objective of this study was to quantify and compare the vertical distribution of soil organic carbon stocks (SOCs) in shrub-encroached and open grassland sites. To achieve this, soil samples were collected vertically at 10 cm depth intervals under both sites. The results showed that SOC was on average 19% and 13% greater in the topsoil and subsoil respectively, under shrub-encroached grassland compared to open grassland. In both topsoil and subsoil, lower SOC_s were found under shrub-encroached (4.53 kg m⁻² and 3.90 kgm⁻²) relative to open grassland (4.39 kgm⁻² and 3.67 kgm⁻²). These results demonstrate that deeper soil horizon play a critical role in the storage of SOC in savanna grassland.

Keywords : savanna grasslands, shrub-encroachment, soil organic carbon, vertical distribution

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