Sensitivity analysis of carbon sequestration in West Africa to temperature and moisture using the DSSAT-CENTURY model. (A03-walen091710-Poster)

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Abstract:

The potential for soil organic carbon (SOC) sequestration in West Africa is limited by water and nutrients. Improvements in soil quality and yield from amendments are affected by temperature and soil water (SW). The objective of this research was to gain a better understanding of interactions between soil and management factors relative to improving yield and increasing SOC in this region. We used the DSSAT cropping system model linked to the CENTURY SOM-Residue module with 3 approaches for simulating SW limitation and 2 for soil temperature. Simulations were conducted for 30 yrs using soils collected from Mali with SOC ranging from 0.14 to 1.18% and daily weather data with an average annual rainfall of 545mm falling within in a 5-month period. Increases in SOC were sensitive to additions of crop residue while yield showed increases with combinations of residue, manure, fertilizer and decreased runoff. Yield and SOC changes were highly sensitive to varying SW methods, but less so to soil temperature. Research is needed to quantify the effects of SW on soil organic matter decomposition where the soil is dry much of the year, such as in much of West Africa.

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