STRUCTURAL STABILITY AND HYDRAULIC CONDUCTIVITY OF NKPOLOGU SANDY LOAM SOIL UNDER DIFFERENT LAND COVERS IN SOUTHEASTERN NIGERIA.

Azuka C.V. and Obi M.E.
Department of Soil Science, University of Nigeri, Nsukka.

ABSTRACT
Studies were conducted in the runoff plots at the University of Nigeria Nsukka Teaching and Research Farm in 2010 and 2011 to monitor the changes in structural stability and saturated hydraulic conductivity (Ksat) of Nkpologu sandy loam soil under different cover management practices. The management practices were bare fallow (BF), grass fallow (GF), legume (CE), groundnut (GN), sorghum (SM), and cassava (CA) cultivation. Three samplings were carried out at the study site following the characterization of the soil at five-month interval marking the end of first cropping season, and the start and end of the second cropping season respectively. There was no change in soil texture due to treatments. The aggregate stability (AS), mean weight diameter (MWD), water dispersible silt (WDSi), aggregate size distributions (> 2 mm, 1-0.5 mm and < 0.25 mm) and Ksat showed significant (P = 0.05) changes with time. Ksat varied (CV = 52%) significantly (P = 0.05) with a standard deviation (SD) value of 7.8. The highest values for Ksat, AS and MWD were obtained in the first sampling period whereas the lowest values were obtained in the last sampling period. There were significant effect (P =0.05) of cover management practices on AS, MWD and Ksat. The highest values for AS, MWD and aggregate size fraction > 2 mm were obtained under GF whereas the highest Ksat was obtained under GN. The lowest values for these parameters throughout the sampling periods were obtained under BF. The preponderance of aggregates < 0.5 mm under BF showed that raindrop impact and other agents broke down macroaggregates into microaggregates. The cover treatments generally increased organic matter (O.M.) content compared with the BF. The O.M. had significant correlation with two aggregate size ranges; 1-0.5mm (r = - 0.276* at P=0.05) and 0.5-0.25mm (r = - 0.245* at P =0.05). The study has shown that cover management practices affected the structural properties of the tropical sandy loam soil differently over time.

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