CHANGES IN SOIL CARBON UNDER DIFFERENT MANAGEMENT PRACTICES

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ABSTRACT

There is a great potential of storing and improving carbon in tropical agricultural soils by applying ecologically sound management practices. In this research soil carbon fractions and stocks under different agricultural management practices were studied in Sri Lanka. Annual crop organic fertilizer only (A-OF), Annual crop inorganic fertilizer only (A-IF), Annual crop organic + inorganic fertilizer (A-O/IF), Perennial crops (PC) and a Home garden (HG) which are different in tillage and fertilizer applications were selected. Home garden abandoned for 20 years (AHG) was included to study no tilled conditions. A-OF showed the highest soil organic carbon (SOC) fractions probably as a result of continuous supply of organic fertilizer for years. Conversely a lower SOC and other labile fractions were measured in A-IF probably due to greater decomposition of native soil organic matter under mineral fertilizer. SOC and C stocks observed in AHG were greater than all other land uses, as a result of greater residue accumulation at the soil surface with zero tillage. Comparatively higher microbial biomass carbon (MBC) in A-OF shows that microbiological status in annual crop sites are better under organic fertilizer compared to even other perennial land uses. Water soluble C is comparatively high in both home gardens (HG/ AHG) and PC possibly as a result of the fresh residues return to the soil while residue returns in annual crop sites were minimal. Soil C stocks of annual crops can be improved compared to all other perennial land uses by using organic fertilizer application. Inorganic fertilizer in annual crops improves soil carbon storage only when combining with organic fertilizers.