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Tillage and organic materials affects soil organic carbon under wheat-rice cropping system in Typic calciargids soils

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The use of appropriate tillage practices and organic materials have received renewed attention to crop production in general and soil carbon storage in particular. The agricultural practices can contribute significantly to increase soil carbon sinks and reduce GHG emissions by sequestration of carbon from atmospheric CO_2at very low cast. Very little work had been done in this regard in Pakistan and especially under wheat-rice cropping system. These positive effects have been suggested based on field experiments though involving different tillage practices and organic materials in *Typic calciargids* soil. Wheat and rice crops were sown for two consecutive years with deep, conventional and minimum and deep tillage practices (CT, MT and DT, respectively) and 0, 15 and 30 Mg ha^{-1} organic materials (OM_0, OM_{15} and OM_{30}, respectively). After first year of cropping, the soil organic carbon (SOC) significantly (p<0.05) varied with different tillage and organic materials in different layers of soil profile. At 0-15 cm, the SOC concentration calculated was the highest (0.114 Mg ha^{-1}) in case of MT with organic material at 15 Mg ha^{-1} and the CT with OM at 15 Mg ha^{-1} recorded the highest SOC (0.127 Mg ha^{-1}) at 15-30 cm soil depth. MT with 30 Mg ha^{-1} organic material recorded the highest SOC (0.125 Mg ha^{-1}) at 30-50 cm soil depth. The lower soil depths (50-75cm and 75-100cm) recorded the highest SOC in case of DT with OM at 15 Mg ha^{-1} (0.113 and 0.107 Mg ha^{-1}, respectively). Varying SOC levels were recorded after second year of cropping. At surface soil layer (0-15cm), the SOC concentration was highest (0.109 Mg ha^{-1}) under MT where OM was applied at 30 Mg ha^{-1}. This suggests that farm manure application at higher rate increased the SOC concentration compared with mineral fertilization. The CT with 15 Mg ha^{-1} organic materials resulted in the highest SOC contents at 15-30cm (0.127 Mg ha^{-1}). For the deeper soil layers (50-75cm and 75-100cm), DT again proved with the highest SOC (0.114 and 0.109 Mg ha^{-1}) with OM at 15 Mg ha^{-1}. It was concluded that the benefits effects of different tillage practices and organic material levels on SOC is premature and further work is needed to determine its suitability depending on soil types under various agro-ecological conditions. However, this information may be used to assess the contribution of different tillage systems and application of organic materials for maximizing crop yield and soil carbon sequestration in semiarid regions of Pakistan.