

Soil Organic Carbon and Nutrients in Smallholding Land Uses in Southern Ethiopia

Authors : Mekdes Lulu

Abstract : This study assessed the soil organic C (SOC) and soil nutrients in smallholding home garden, woodlot, grazing land, and cropland at two soil depths and two sites in Wolaita Zone, southern Ethiopia. The results showed that soil properties were significantly influenced by land use. The home garden had significantly higher ($p < 0.05$) SOC and soil nutrients when compared to the cropland. When the home garden was compared to the woodlot and grazing land uses, it had significantly higher ($p < 0.05$) values except in SOC, total N (TN), cation exchange capacity (CEC), and exchangeable Ca. Cropland, in comparison with grazing land and woodlot, had a non-significant difference except TN. The SOC stock (0-40 cm) in the home garden, woodlot, grazing land and cropland was 79.5, 68.0, 65.0, and 58.1 Mg ha⁻¹, respectively. Home garden significantly differed ($p < 0.05$) in SOC only from cropland, and this was attributed not only to the relatively higher organic input in the home garden but also to the little organic matter input and frequently tillage of the cropland. The similar SOC among the home garden, woodlot and grazing lands may imply that the balance between inputs and outputs could be nearly similar for the land uses. Soil TN and CEC had a nearly similar pattern of difference as in SOC among the land uses because of their close relationship with SOC. In general, the land use influence on soil nutrients can be in the order: home garden > wood land » grazing land » cropland, with home garden showing the least difference from the woodlot and the greatest from the cropland. In the agroecosystem, in general, the influence of smallholding home garden on SOC and soil nutrient was marginally different from Eucalyptus woodlot and grazing lands but evidently different from cropland.

Keywords : cropland, grazing land, home garden, soc stock, soil nutrients, woodlot

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