Abstract

Soil hydrologic response depends on the soil characteristics such as infiltration capacity, porosity, organic matter content and bulk density. Knowledge on the dynamics of these soil parameters and soil hydrologic response as a result of different land use types is crucial for formulation and adoption of proper soil and water conservation techniques for increased agricultural production. In this research, soil hydrologic response to different land use types is evaluated. Four land use types were purposely selected. These included natural forest, deforested land, fallow agricultural land and grassland. Soil samples were collected and soil hydraulic and hydrological properties that included soil texture, bulk density, saturated hydraulic conductivity, porosity and organic matter content were determined in the soil laboratory. The evaluated soil hydrological response parameters included runoff coefficients, infiltration rate, water repellency and ponding time. The findings showed that the highest and lowest mean bulk density of 1.36 and 0.96 g/cm3 was recorded for deforested and natural forest land respectively. The highest mean saturated hydraulic conductivity (170.21cm/day), porosity (0.62) and organic matter content (4.63%) were observed in the natural forest while the lowest values (24.78cm/day, 0.47 and 0.75%) respectively were found in the deforested land. High water repellency (100.34 cm/hr) and runoff coefficient (0.0077) was recorded in the deforested areas. The findings of this indicate how different land use types affect on-site hydrologic response and generation of stream flow in the catchment hence providing baseline data for future soil and water relations research.