Potato-legume intercropping on a sloping terrain and its effects on soil Physico-chemical properties

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Abstract

Aims: To assess the effects of potato-legume intercropping on selected soil physical and chemical properties after four consecutive growing seasons (from the short rains in 2014 to long rains 2016).

Methods: The experiment was laid out in a randomised complete block design with four replicates. The treatments were potato-dolichos (PD); potato-garden pea (PG); potato-bean (PB) intercropping systems, and a pure stand of potato (PS). After every harvest, crop residues were ploughed back and selected soil physico-chemical properties were assessed after two years of cultivation.

Results: Potato-legume intercropping resulted in a significant increase down the slope for clay and silt under PS, PG and PB whereas; an opposite observation was made for sand and bulk density. Nonetheless, under PD, slope position had no significant effect on soil physical properties. In all cropping systems, a significant increase was observed down the slope for pH and cation exchange capacity. Similar observations were made for phosphorous, nitrogen and organic carbon under all the cropping systems except PD.

Conclusions: This study has established PD as a viable intercropping system, which could be adopted by farmers for improved soil fertility.

Keywords: Soil fertility; Slope position; Spatial variation; Intercropping systems; Crop residue incorporation