

Abstract

Arid and semi-arid lands account for over 80% of Kenya's landmass and support about 35% of her population. About 65% of the inhabitants live below the poverty line. Several workers have described the situation currently evident in these regions as a "poverty trap", in which the highly subsistence population living on degraded soils receives low income, afford low or no farm inputs, and consequently get low crop yields. Studies indicate that pigeonpea could reverse this trend. It ameliorates soils and boosts cereal yields tremendously. Locally, however, little has been done to quantify these benefits. This study therefore sought to: (1) quantify the amount of N, P and C accumulated by the different components of maize-pigeonpea intercropping systems and its effect on soil C, N, P and exchangeable bases, and (2) assess the effect of pigeonpea cropping systems and residue management on soil aggregation and soil water content. The study was conducted at Katumani Research Centre for three seasons. Intercropping cereals with short duration pigeonpea varieties depressed both pigeonpea grain and N yield. Cropping systems also influenced accumulation of P in yield components of maize and pigeonpea. However, there were no major changes in soil C, N and P. Soil macro- and micro-aggregates were affected by cultivation and cropping systems. Cultivation reduced macro-aggregation but increased microaggregation.

Soil water content increased across cropping systems with increase in residue application rate. Thus, pigeonpea cropping systems have the potential to enrich or deplete the soil, depending on the management.