

Abstract

A study was conducted to characterize the main factors critical to the distribution of key wood species and quantify the effects of land use on the tree layer in a semi-arid area of Kenya. Units studied were small-scale farms, group ranches, small-scale ranches and conservation areas. Small-scale farms such as those with the smallest land size per household, highest livestock density and highest proportion of cultivated land were the most intensively utilized. Among the environmental variables assessed soil moisture and phosphorous accounted for the highest variation in the study area as shown by Principal Component Analysis (PCA). Classification of tree abundance data separated 5 plant associations, which differed significantly in diversity and on 4 soil factors. The primary compositional gradient extracted using Detrended Correspondence Analysis (DCA) characterised chiefly by increasing *Acacia drepanolobium* was correlated to an increasing soil pH/moisture gradient. On the second axis *Balanites aegyptiaca* increased on phosphorous gradient. Trees in the stratum above 2M had the lowest relative dominance in the small-scale farms and the highest in the conservation areas. The differences in structure were attributed to heavy tree utilization. The results elucidate that land use impacts were superimposed on vegetation gradients, which in turn were largely explained by environmental variation.