Abstract

Woodlands in Kenya are under pressure from agriculture, livestock keeping and a host of timber and non-timber forest uses, including charcoal production. However, the exact influence of charcoal production and other anthropogenic factors on different dimensions of woodlands is still unknown. We examined the effect of charcoal production and different other land uses on woodland structure, species composition, biomass and regeneration in a woodland area in Kenya. Information collected from 71 sample plots (50m × 20m) and from a recent land cover map was used to classify the woodland area into ten land use categories based on land cover, charcoal production intensity, grazing presence and land ownership. The results show that species diversity, tree density and biomass decreased with increasing intensity of land use, with agriculture and charcoal production being the leading causes. The influence of land cover was confirmed by the significant differences in diameter size class distributions ($p < 0.001$) and density ($p = 0.01$) between farmlands, transitional woodlands and woodlands. Redundancy analysis (RDA) of species abundance also clearly separated the various land uses. Charcoal production intensity caused significant differences on diameter size class distributions ($p = 0.02$) and stem density ($p = 0.002$). The results of land ownership are less pronounced. Overall, our results suggest the need of integrated land use management in order to balance the various land uses and ensure sufficient regeneration of woodland species valuable for the livelihood of the inhabitants and the ecological values of the region.