

Abstract

Tree-based solutions are more efficient in nutrient cycling in farming systems and hence ideally suited for impoverished farmers experiencing food insecurity. Agroforestry trees have a positive effect on soil fertility through litter fall by the canopies compared to that of the adjacent open fields. Field sampling involved selecting mature *Cordia africana* trees from ten farms and collecting soil samples at varying distances from the tree trunks and at two depths (0-15 and 15-30cm). For each selected farm, soil samples were collected at three sampling points defined by distance from the tree base thus: - 5M (under the tree canopy), 11M (at the edge of the crown), and 30M (from the tree's influence. Laboratory analyses measured concentrations of nitrogen, phosphorus, potassium, calcium, magnesium, and organic carbon. The soil parameters investigated (Nitrogen, Phosphorus, Soil organic carbon, Potassium, and Calcium) were significantly higher in the topsoil than in the subsoil. The horizontal effect of trees with increasing distance from the tree on soil nitrogen, organic carbon, and phosphorus is minimal, the effect being more on vertical distribution (across depth). Differences in nutrient contents in soil nutrient variables between agroforestry and cropped land showed that soil nutrients within the *Cordia africana* system were higher than those under cultivated land implying that *Cordia africana* has a positive effect on soil quality. Thus, the study emphasizes the adoption of *Cordia africana* in agroforestry practices with a view to increase soil fertility and improve crop yields in sustainable farming. There is therefore need for the formulation of appropriate measures of soil management based on the characteristics of the sites.