Abstract

Combined use of organic resource (OR) and mineral resource (MR) of nutrients is accepted as one of the most appropriate ways to address the problems of declining soil fertility and poor crop yields facing small-scale farming in sub-Saharan Africa. A field study was conducted at Embu in Central Kenya to investigate the effect of OR and MR management on aggregate turnover, C sequestration and N stabilization. The study comprised of ORs of differing quality: *Tithonia diversifolia* (high quality), *Calliandra calothyrsus* (medium quality), *Zea mays* stover (medium quality), *Grevillea* robust sawdust (low quality) and farmyard manure applied at a rate of 4 ton C ha^{-1} with or without 120 kg N ha^{-1} mineral fertilizer. Soil organic matter (SOM) fractions from soils sampled from the top soil (0–15 cm depth) at the establishment of the field trial in 2002 and before the long rains in 2005 were analysed for C, N and C-13 signatures. In 2005, SOM fractions C and N quantity was higher for both sole and combined application of *Tithonia*, *Calliandra*, stover and manure compared to the initial (2002) total soil C and N. High-quality ORs had the highest SOM input compared to low-quality ORs while medium-quality ORs contributed most to the formation of stable macroaggregates and SOM accumulation. Therefore, both OR quality and MR should be considered when devising soil management options for soil fertility and crop production.