

Kihara, J., Bationo, A., Waswa, B., Kimetu, J.M., Vanlauwe, B., **Okeyo, J.**, Mukalama, J., Martius, C., 2012. Effect of Reduced Tillage and Mineral Fertilizer Application on Maize and Soybean Productivity. *Experimental Agriculture* 48(2), 159-175.

ABSTRACT

Reduced tillage is said to be one of the potential ways to reverse land degradation and ultimately increase the productivity of degrading soils of Africa. We hypothesised that crop yield following a modest application of 2 t ha⁻¹ of crop residue in a reduced tillage system is similar to the yield obtained from a conventional tillage system, and that incorporation of legumes in a cropping system leads to greater economic benefits as opposed to a cropping system involving continuous maize. Three cropping systems (continuous maize monocropping, legume/maize intercropping and rotation) under different tillage and residue management systems were tested in sub-humid western Kenya over 10 seasons. While soybean performed equally well in both tillage systems throughout, maize yield was lower in reduced than conventional tillage during the first five seasons but no significant differences were observed after season 6. Likewise, with crop residue application, yields in conventional and reduced tillage systems are comparable after season 6. Nitrogen and phosphorus increased yield by up to 100% compared with control. Gross margins were not significantly different among the cropping systems being only 6 to 39% more in the legume–cereal systems relative to similar treatments in continuous cereal monocropping system. After 10 seasons of reduced tillage production, the economic benefits for our cropping systems are still not attractive for a switch from the conventional to reduced tillage.