

Assessing conservation agricultural production systems (caps) for small holder farmers in rain-fed farming system in sub-saharan Africa (ssa)

The challenge of sufficient food production by farmers in rainfed farming systems of sub-Saharan Africa is exacerbated by soil degradation and poor soil nutrient status. The objective of this study was to assess the effects of reduced and no tillage and velvet bean (*Mucuna pruriens*) cover crop on greenhouse gas (GHG) emissions and noxious weed population in alternative cropping practices to maize-bean production. Using a completely randomized block design, four replications of three tillage intensities and three cropping practices were established on two climatically different sites: Tranz-Nzoia in western Kenya, and Tororo in western Kenya and eastern Uganda, respectively. While CO₂ emissions are comparable among sites and tillage treatments, N₂O had significantly higher emissions in low elevation sites (where there are two growing seasons) and CH₄ assimilation declined under reduced and no-tillage at high elevation sites. Reduced tilling also had a lower presence of narrow leaf species of weeds than deep tillage, but shallow hoeing had a lower weed density than no-till methods.