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.