

## **Abstract**

Declining soil fertility is a major food production constraint in most smallholders who rarely apply chemical fertilizers to the crops. Mucuna, a high yielding and N fixing legume that is widely adapted to a range of agro-ecological zones has the potential to improve maize yields in such systems. Integration of mucuna into such systems may involve management strategies that optimize complementary resource use in the system. The strategy used was staggering the relative planting time of mucuna in maize intercrop. The work was done in the upper midlands of Kenya at Kabete and Embu for eight seasons from 2001 to 2005. Maize yield was not affected by inter-planting with mucuna but mucuna biomass in the intercrop was 75% lower than in the sole crop. Delayed planting reduced mucuna biomass significantly but planting density did not have a significant effect on biomass production possibly because of compensatory growth. Maize had a comparative advantage over mucuna in light and water capture because it grew faster and taller and had a much larger root system than mucuna and therefore intercropping only reduced mucuna biomass. Although intercropping maize and mucuna improved land productivity when seasonal rainfall exceeded 300 mm, the amount of biomass produced did not improve maize yields in the subsequent season. Pure cropped mucuna stands produced the highest amount of biomass, indicating that maize-mucuna rotation could supply adequate amounts of biomass for a subsequent maize crop.