

The Century model was developed to simulate a banana re-establishment experiment in Mukono District, Uganda. Assumptions of assimilate allocation patterns between shoots, roots and bunches were necessary. The complex pattern of grass fallow, burning, maize, chemical fertilization and different management methods for banana could be simulated using schedule routines of the model, but some adjustments were necessary to allow for perennial growth. Two separate harvest files were constructed to account for harvesting bunches and removing basal offshoots. At the first harvest (18 months after sowing) the simulation receiving 10 t napier grass (*Pennisetum purpureum*) had total aboveground biomass (dry weight) and fresh bunch yields greater than that of the simulation receiving no inputs, by 5.0 and 1.0 t ha⁻¹, respectively. After 6 years of harvest, average annual yields were 5.1, 6.1 and 7.6 t ha⁻¹ in the control, livestock manure (10 t ha⁻¹ year⁻¹) and napier grass treatments, respectively. Simulated soil organic carbon content increased from 2.2 to 3.8% in the treatment receiving napier grass and harvest residues, but increased only slightly in the complete control (2.5%). Model outputs suggest that a near 'steady-state' in banana biomass is achieved due to periodic senescence of mature pseudostems, bunch harvest and offshoots. Model outputs suggest that external organic inputs of 10 t ha⁻¹ year⁻¹ influence banana productivity to a greater extent than the retention of banana residues.