An on-farm study to evaluate three methods of applying legume residues in maize-based cropping systems in Gatanga, central Kenya was initiated in 1997 and conducted for three years. The legumes involved in the study were velvet bean (Mucuna pruriens) and crotalaria (Crotalaria ochroleuca) and were planted between maize rows, two weeks after planting the maize. After harvesting the maize, the legumes were left growing in the field until land preparation for the next maize crop. The legume forage was harvested and was either incorporated into the soil, left on the surface as mulch or removed from the field before planting the maize crop. Results indicated that during the first cropping season when green manure legumes were establishing, maize grain yields were depressed by an average of 33% compared to the no input control treatment. The legume treatments increased maize grain yields from a mean of 1.0 t ha⁻¹ in the no input controls to a mean of 1.6 t ha⁻¹ during the 1998 and 1999 long rains cropping seasons. Over the two cropping seasons, incorporation of legume residue into the soil gave a higher maize yield (2.1 t ha⁻¹) compared to leaving the legume biomass on the surface as mulch (1.4 t ha⁻¹). The effects of below ground biomass on maize yields were minimal. The legume treatments did not significantly affect soil N, P, K and organic carbon. Farmers identified several niches for the green manure legume technology which included, intercropping the legumes with maize and incorporating legume biomass for soil fertility improvement, growing legumes under coffee bushes and avocado trees as cover crops and planting legumes on steep slopes for soil erosion control.