Although N-rich leaf biomass of multipurpose trees is known to be a good source of N to crops, integrating such trees into crop production systems is a major challenge in the development of viable agroforestry systems. An approach to integrating calliandra (Calliandra calothyrsus Meissner) and leucaena (Leucaena leucocephala (Lam.) de Wit), two promising agroforestry tree species, into maize (Zea mays L.) production system was investigated in the subhumid highlands of central Kenya during four maize-growing seasons from 1994 to 1996. The experiment consisted of maize plots to which tree prunings obtained from hedgerows grown either in situ (alley cropping) or ex situ (biomass transfer from outside) were applied. When alley-cropped with leucaena, maize produced significantly higher yields compared to maize monoculture (both non-fertilized and fertilized) treatments, but when alley-cropped with calliandra, the yield of maize was less than that of the monocropped unfertilized control. Application of ex situ grown calliandra and leucaena prunings with or without fertilizer resulted in higher maize grain yield than in the nonfertilized and fertilized treatments. Yields of calliandra alley- cropped maize were 11% to 51% lower than those of nonalley-cropped treatments receiving calliandra prunings from ex situ grown trees; the decrease was 2% to 17% with leucaena, indicating that calliandra hedges were more competitive than leucaena hedges. The alley-cropped prunings-removed treatments produced the lowest maize yields. The study showed that, in the subhumid tropical highlands of Kenya, inclusion of calliandra hedges on cropland adversely affected maize yields. On the other hand, alley cropping with leucaena was advantageous.