Intercropping and its Implications for Soil Management

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Intercropping has always been part of the traditional farming systems in the tropics. The local knowledge about the most appropriate mixes of crops has been passed from generation to generation. When people looked at the natural ecosystems, they saw many species growing together in each location, so it was natural to also plant more than one crop species in the field at one time or during one season. These polyculture cropping systems that have been traditionally used by people in developing countries in Africa and Latin America can provide a key solution to sustainable agriculture in the tropics (Francis and Adipala, 1994; Rusinamhodzi et al., 2006). Stern (1984) reported that about 80% of cultivated land in West Africa was under intercropping. Scientific research is continually being performed on a range of multicropping systems and Connolly et al. (2001) reported on studies in at least 50 countries and with various combinations of a total of 55 different species. The top four species in these studies were maize (Zea mays L.), cowpea (Vigna unguiculata L. Walp.), wheat (Triticum aestivum L.), and groundnut (Arachis hypogaea L.), 67% of the studies were performed on-station, and 49% of the studies only lasted 1 yr (Connolly et al., 2001).

Common intercropping systems include maize (Zea mays L.), millet [Pennisetum glaucum (L.) R. Br.], and sorghum [Sorghum bicolor (L.) Muench] as dominant cereal crops, intercropped with legume crops such as beans (Phaseolus vulgaris L.), cowpea, groundnut, pigeon-pea [Cajanus cajan (L.) Huth], and soybean [Glycine max (L.) Merr.] as the companion plant species. Maize–cowpea is promoted among smallholder farms in Zimbabwe (Ncube et al., 2007), Maize–pigeon-pea is practiced in Malawi (Gladwin et al., 2001) and northern Mozambique. According to Olufajo (1992), in the traditional soybean growing areas of Nigeria, soybean is commonly intercropped with cereals like maize, sorghum, and millet. According to Ofori and Stern (1987), cereal and legume intercropping is recognized as a common cropping system throughout tropical developing countries for both capital-intensive commercial and subsistence farming (Fig. 221a,b). In Latin America, crops produced by farmers include maize, beans, cassava (Manihot esculenta Crantz), and quinoa (Chenopodium quinoa Willd.) (Altieri, 1996). The smallholder farmer uses land intensively, with maize and beans often being grown simultaneously in the same field. An Acacia senegal (L.) Willd. agroforestry system that has been traditionally practiced in the Sudano-Sahelian region is a complex and