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Agricultural Biodiversity: Lessons from the Smallholder Traditional Farming Systems of the Central Rift Valley Province of Kenya

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Abstract

Agricultural biodiversity (Agrobiodiversity) is a consequence of human activity, that in turn, depends on it for providing food and other natural resource-based goods. The present study gives examples from the Central Rift Valley Province of Kenya on how smallholder farmers preserved, maintained and utilised both planned and associated biodiversity on their farms. A total of 36 farmers, 12 from each study site (Gilgil, Lare and Molo), were selected for a detailed agrobiodiversity (crops, weeds, trees/shrubs, biotopes and livestock) analysis during the long and short rain seasons of 2004/2005. Semi-structured questionnaires, observations and farm transect walks were the tools used for data collection. Weed, tree/shrub, biotope and crop diversity were determined using Shannon-Weaver diversity index (H) and an index of crop diversification (ICD).

About 13 different crops were grown per site with maize, irish potatoes and intercrops (maize/beans, maize/irish potatoes, maize/irish potatoes/beans and irish potatoes/beans) being the major crops grown across sites. The ICD was significantly high during the long rain season. A variety of weed species were identified on crop fields with *Bidens pilosa*, *Pennisetum calendestinum* and *Conyza bonariensis* domineering across sites. In total, 31 (Gilgil), 22 (Lare) and 27 (Molo) different tree/shrub species were recorded with *Gravillea robusta* predominant across sites. The H for weeds and tree/shrub species was high (>1.5) for all sites. Biotopes varied from site to site but the hedgerow, with highest species diversity, and field margins were the most frequent biotopes. Cattle, sheep, goats, and chicken were the principal livestock kept at each site.

The chief benefits of agrobiodiversity were food and financial security, besides provision of construction materials, medicines, organic fertilisers, fuels, livestock fodder and nutrient cycling. Based on the diverse types of crops, livestock, weeds, trees and shrubs and the presence of biotopes on farm, the smallholder farming systems were ecologically sustainable.

Research and extension efforts ought to be directed towards the promotion of conservation and sustainable use of agrobiodiversity. Additionally, lessons should be drawn from the green revolution of the 70s, which nearly wiped out the traditional farming system of production and by extension agrobiodiversity.

Keywords: Agro-biodiversity, biotopes, green revolution, Kenya, smallholders