

Abstract

Semi-arid lands of Kenya are found in agro-climatic zones 4 and 5 occupying 20 percent of land area. Annual rainfall ranges from 500 to 800 mm per annum. In semi-arid Eastern Kenya, the "short rains" (October-December) with a peak in November are more reliable than the "long rains" (March-May) with a peak in April. The rate of evaporation is high due to high daytime temperatures. Annual potential evapotranspiration varies between 1500 and 2000 mm, exceeded by rainfall during the months of April and November in the wetter areas. The predominant soil types are sand to loamy sands, luvisols, acrisols and vertisols. They harden when dry, but are friable when wet. They are shallow in the drier areas, with low organic matter content, low water-holding capacity, acidity (pH 5.0 to 6.5) in the surface horizon, poor nutrient status and, due to poor structural development, high tendency to erode and surface sealing and capping. Nitrogen and phosphorus deficiencies have been identified as major limitations to crop production in these soils. With intensive cropping, sulphur may become a limiting nutrient. Vertisols are heavy and sticky when wet, are prone to water logging due to poor drainage, and are difficult to till when dry. More than 70 percent of the farm output is retained for domestic consumption and family incomes are generally very low. 88 percent of farmers had adopted organic fertilizers while only 28 percent used inorganic fertilizers. Farmers who own oxen and ploughs use them for land preparation, planting and weeding. Farmers who do not own ploughs use hand tools. The use of inorganic fertilizer is very low. Crop rotation is almost nonexistent as almost all farmers grow their crops in mixtures. Crop residues are an important livestock feed and hence are not available for retention on croplands. Limited mulching is practiced in kitchen gardens. Limited supplementary irrigation, using water from permanent rivers, seasonal streams and dams, is used for the production of horticultural crops, which are important in the cash economy of these areas.