

Abstract

A study was carried out in five irrigation schemes in Taveta County to investigate the extent of soil salinization to develop an effective management strategy for increased crop production and food security in irrigation schemes where crop productivity is declining due to soil salinity encroachment. The research involved sampling irrigation waters and soil from the water sources and the irrigation schemes, respectively. Water analysis showed that irrigation water from Kasokoni (1119.9 $\mu\text{S}/\text{cm}$ and $[\text{Na}]$ of 3.92 me/l), Rama springs (1363.75 $\mu\text{S}/\text{cm}$ and $[\text{Na}]$ of 5.75 me/l) and Kimala can al (1328.67 $\mu\text{S}/\text{cm}$ and $[\text{Na}]$ of 4.59 me/l.) (From Lumi River) were saline. Water from Njukini (279.2 $\mu\text{S}/\text{cm}$ and $[\text{Na}]$ of 0.66 me/l), Challa (386 $\mu\text{S}/\text{cm}$ and $[\text{Na}]$ of 1.16 me/l), Njoro Kubwa (244.4 $\mu\text{S}/\text{cm}$ and $[\text{Na}]$ of 0.632 me/l), Grogan springs (377 $\mu\text{S}/\text{cm}$ and $[\text{Na}]$ of 0.73 me/l.) and Lumi springs (207 $\mu\text{S}/\text{cm}$ and $[\text{Na}]$ of 0.387 me/l) before joining Kasokoni springs were not saline. Kamleza-Kimoringo soils irrigated with water from Njoro Kubwa, of low salinity, were found to be more saline ($P \leq 0.05$) (Ece 1.66 mS/cm) than other soils from other schemes whose Ece were generally below 0.56 mS/cm. These soils were at the lowest part of the irrigation schemes near Lake Jipe, had a clay texture (48.74 % clay, 27.26 % silt and 23.68 % sand), and significantly ($P \leq 0.05$) more soluble salts (mean Ca^{2+} 20.968 me/100g soil). Soil pH, Ece, $[\text{Na}^+]$, $[\text{Ca}^{2+}]$ did not vary with soil depth. It was concluded that the salts could have been deposited through runoff for most of the irrigation schemes and or left by the retreating nearby Lake Jipe for Kamleza-Kimoringo irrigation scheme soils. However, the irrigation water has potential for salinization but not to the extent reported in this paper. These salts are removable through drainage and interventions that dissolve the salts or remove them from the soils like phytoremediation, use of manure and crop residue incorporation