

Nutrient reduction in runoff water from sugarcane farms by sedimentation method

Solomon Omwoma; W. Nyaigoti Omwoyo; Joseck O. Alwala; David M. K. Onger; Lagat C. Sylus; Joseph O. Lalah

Abstract

Due to intensive use of agronomic inputs in sugarcane farming, runoff water from these farms is loaded with high concentrations of nutrients. These nutrients find their way into rivers, lakes and sinks, eutrophication. Reducing the levels of these nutrients in runoff water from sugarcane farms before it is discharged into sinks will help solve the problems that arise out of eutrophication. This study employed a simple sedimentation method of making depressions in canals draining runoff water from sugarcane farms and emptying them fortnightly during the rainy season and monthly during the dry season. The method was found to significantly ($p \leq 0.05$) reduce water conductivity ($\mu\text{S}/\text{cm}$), turbidity (Nephelometric Turbidity Units), total phosphates, nitrate–nitrogen, potassium, calcium, magnesium, iron, copper, sodium and zinc (ppm) in the dry season from 52.89, 148.70, 0.87, 3.34, 446.00, 420.00, 205.00, 12,941.00, 261.00, 398.00, and 484.00 in untreated canals to 48.33, 30.22, 0.21, 2.95, 120.00, 154.00, 98.00, 456.00, 181.00, 234.00, and 311.00 in treated canals, respectively. And in the wet season, the parameters were reduced from 261.46, 719.30, 820.00, 25.16, 654.00, 549.00, 493.00, 19,230.00, 763.00, 748.00, and 903.00 to 128.67, 365.70, 3.47, 10.12, 136.00, 187.00, 167.00, 654.00, 207.00, 321.00, and 231.00, respectively. Dissolved oxygen significantly ($p \leq 0.05$) increased from 5.11 to 8.14 ppm in the dry season and from 3.82 to 7.92 ppm wet season. Acidity reduced in the wet season from pH 5.02 to 6.20. It is, therefore, recommended that sugarcane farmers adopt this method for sustainability of aquatic systems within these zones.