

Keywords:

- **ecological integrity;**
- **natural purification;**
- **nutrient levels;**
- **riparian zone;**
- **subwatersheds;**
- **upland land use;**
- **water quality**

Abstract

Data from 10 sampling sites along the River Njoro are used to examine the contribution of nutrients from upstream land uses draining each of the sampling sites. The data also are used to assess whether both the proportion of land uses and the size of the subwatersheds account for the variability in water quality in the River Njoro watershed.

Geographical Information System analysis was used to determine the spatial distribution of land-cover types and subwatersheds contributing run-off to the sampling sites in the River Njoro. Standard Digital Elevation Model-based routines were used to establish the watershed area contributing run-off to each sampling site. Water and sediment samples were collected for chemical analysis, and the nutrient levels were related to the upstream land-use types and the size of the subwatersheds. The mid-stream portion of the River Njoro (near Egerton University) accounts for the highest nutrient contributions. The percentage contribution is magnified by additions from industrial, human settlements and agricultural land uses around the University. There is a significant decrease in nutrient levels downstream, however, indicating natural purification as the river flows through an area of large-scale farming with intense, well-preserved riparian and in-stream vegetation. Steep slopes of the land upstream of Egerton University enhance erosion and nutrient losses from those subwatersheds. Mixed small-scale agricultural and bare lands contribute over 55% of the phosphorus load to the upper and mid-reaches of the River Njoro. The size of the subwatershed accounts for about 53% of the variability in the soluble phosphorus in the river. The land-use subwatershed proportions are important for characterizing and modelling water quality in the River Njoro watershed. Upland land uses are as important as near-stream land uses. We suggest that conservation of intact riparian corridor along the river and its tributaries contributes significantly to natural purification processes and recovery of the ecological integrity of the River Njoro ecosystem.