

# **Factors contributing to the spatial variability of Katumani soils, Eastern Kenya**

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## **Abstract**

Higher benefits may be obtained from precision agriculture as a result of improved understanding of the spatial variability of soil fertility under different soil types, vegetation cover and crop management practices. The objective of this study was to determine land factors (vegetation status, soil texture, land use and micro-relief) influencing spatial variability of soil fertility in Katumani area. Soil samples (0 to 30 cm depth) were taken along a rectangular grid measuring 60 m by 960 m cutting across several land uses and types of vegetation cover with a separation sampling distance of 60 m. At each sampling point geographical co-ordinates were recorded and slope determined using GPS receiver and slope meter, respectively. Soil samples were analysed for organic carbon (C), total nitrogen (N), available phosphorous (P), soil pH and texture. Each soil fertility parameter was summarised for each of the four land factors following standard procedures in spatial analyst extension of the Arc view GIS. Land use and vegetation cover were the major factors influencing soil phosphorus where as soil texture influenced soil pH. Micro-relief had no effect on spatial variability of the soil fertility, depicting an unusual relationship. Soil pH was low in loamy sand soils than in the sandy clay. High levels of soil phosphorus were found in cultivated areas suggesting that land use played a role in phosphorus distribution.