

2011

Periodic flooding and land use effects on soil properties in Lake Victoria basin

W., Nancy Mungai

Academic Journals

Mungai, N., Njue, A. M., & AH, V. S. (2011). Periodic flooding and land use effects on soil properties in Lake Victoria basin. *African Journal of Agricultural Research*, 6(19), 4613-4623.

<http://hdl.handle.net/20.500.12661/3329>

Downloaded from UDOM Institutional Repository at The University of Dodoma, an open access institutional repository.

Abstract

Full text article available at

<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.968.8731&rep=rep1&type=pdf>

Frequent periodic flooding and land use changes taking place in the Lake Victoria basin (LVB) in east Africa may cause soil deterioration and further exacerbating food insecurity. Surface (0 to 20 cm) soil samples were collected at three locations along Sondu Miriu (Kenya) and Simiyu-Duma (Tanzania) rivers. Samples were collected from fields that were periodically flooded (1-28 d) and those that never flood, either under grass or crops. Samples were analysed for soil texture, organic carbon (OC), total nitrogen (TN), pH, extractable phosphorus (P), exchangeable potassium (K) and B-glucosidase activities. B-glucosidase activities, clay and P contents were higher in some of the soils that flood, while OC, exchangeable K and sand contents were lower at $P < 0.05$ in flooded soils. Observed differences account for 11% of comparisons in the two river basins. Soils under grass had higher B-glucosidase activities and silt content but lower sand content than cultivated soils in 6% of samples in the two basins. However, conversion of natural ecosystems to grassland or cropped lands resulted in a 17 to 113% reduction in OC, TN, and exchangeable K in Sondu, and a 129% decline in TN in Simiyu. Soil properties exhibited clear but different patterns from upstream to downstream in the two basins. OC, TN, clay and B-glucosidase activities were higher in Sondu upstream, while OC, TN, extractable P and exchangeable K were lower in Simiyu upstream. Observed difference across each basin underscore the importance of inherent soil characteristics in influencing soil properties compared to short-term flooding or short duration changes in land use.