

IMPACT OF TOPOSEQUENCE ON HEAVY METALS IN THE FLOODPLAIN SOILS OF GADABIYU, KWALI AREA COUNCIL, ABUJA, NIGERIA

¹Ahmad Hadiza A. and ²Oludele J. Ayoola

Department of Geography and Environmental Management, University of Abuja, Nigeria

Corresponding Author's email: abubakar.hadiza@uniabuja.edu.ng



Abstract

Monitoring the effects of irrigation on soil quality is considered as central to the issue of sustainable harvest and productivity in irrigated areas. This is largely due to realization of the fact that it can have unfavorable effect on soil properties leading to loss of sustainable productivity if not frequent monitored. Consequently, many studies have been carried out in many parts of the world documenting the various ways in which irrigation alters soil conditions, more especially how irrigation water impact negatively on soil quality. However, such studies are limited in scope as most have not considered the effect of soil catena on productivity of irrigated soils. This study assessed the effect of toposequence position on heavy metals in the flood plain soils of GADA BIYU, KWALI Area Council, Abuja, FCT. Two catena (A and B) and three slope segments were identified. Soil samples were collected from each profile pit in accordance with horizons starting from lower horizons to avoid contaminating samples. Transect placement and sampling intervals along transects were determined subjectively to capture the full range of soil variability within landforms. The depth of the auger borings was 0-15 and 15- 30 cm (surface and sub-surface respectively). The soils were analyzed for lead (Pb), Nickel (Ni), Chromium (Cr) and Cobalt (Co). Descriptive statistics and a One-way Analysis of Variance were used to analyze the data. Findings revealed that values gotten for Lead(Pb) were decreasing with increase in soil depth suggesting that surface horizons of the soils had higher Pb values in the study area, generally Pb was extremely high with values that ranged from 90.75 to 3505.50 mgkg⁻¹ with a mean value of 1326.33 mgkg⁻¹ and standard deviation of 986.20 (SE±239.01). In the same vein, the values recorded for Co was rated as very high, whereas Nickel (Ni) values were rated as being moderate. Cr was higher in the surface soil horizons than on the sub-surface soils. Generally, the study showed that heavy metals in the soils vary within and between the catena and also along the slope. Based on the findings the study recommended periodic test of soil and water sources within the area based on slope positions. This will ensure sustainable soil quality and suitability control. It is important to include this aspect in all plans for irrigation and sustainable soil quality management.

Keywords: Toposequence, Catena, Irrigation, Heavy Metals.