Journal of Agricultural Science
and Research (JASR)
Vol. 3, Issue 2, Dec 2016, 31-40

TRANS STELLAR
•Journal Publications •Research Consultancy

Original Article

EFFECT OF SLOPE, MANAGEMENT AND DEPTH ON SOIL PROPERTIES OF CONTRASTING WATERSHED ECOSYSTEM

NNABUDE. P. C[1], NWEKE. I. A[2] & EKWEALOR. K. U[3]

[1,3]*Department of Soil and Land Resource Management, Nnamdi Azikiwe University, Awka, Anambra, Nigeria*

[2]*Department of Soil Science, Chukwuemeka Odumegwu Ojukwu University, Awka, Anambra, Nigeria*

ABSTRACT

Watersheds are naturally productive but most ecologically vulnerable section of the landscape. Unplanned agricultural activities, characteristic of Nigeria's agricultural system strongly expose these watersheds to adverse climatic conditions and consequently reduce their productivity. Two contrasting watershed management systems were evaluated in a field study using four different slope gradients and three different soil depths. The experiment was arranged in a randomised complete block design (RCBD) with three replicates. Data obtained from the study were analysed using analysis of variance and treatment means were separated using least significant difference (LSD). The findings of the study showed that soil pH ranged from 5.76 – 5.90 in the slopes of the managed plot while the unmanaged watershed recorded soil pH of 4.90 to 5.10. Organic C (1.69gkg^{-1}), available P (20.50mgkg^{-1}), nitrogen (1.168gkg^{-1}) and exchangeable K (0.27cmolkg^{-1}) were higher in 0 – 15 cm soil depth of the four slopes in the managed plots of the watershed than the unmanaged plots with 0.94 gkg^{-1} OC, 6.53mgkg^{-1} available P, 0.19gkg^{-1} nitrogen and 0.15cmolkg^{-1} K except for the slope 4 (lower slope) of the unmanaged plots which had OC of 1.94 gkg^{-1} higher than the managed plots. Top soil depth, fine sand and coarse sand values were greater in the 0 – 15cm soil depth of the managed plots. Clay content and bulk density values (1.56 – 1.7gcm^{-3}) were higher in the soil depths (0 – 15, 15 – 30, 30 – 45 cm) of the unmanaged plots. The overall qualities of soils under the managed system of the watershed were found to be superior to soils of the unmanaged watershed; hence integrated management processes are sure ways in reducing soil erosion, land degradation and increasing soil fertility of a watershed in order to boost its utility.

KEYWORDS: Management, Watershed, Slope, Soil Depth, Soil Properties

Received: Jul 26, 2016; **Accepted:** Sep 22, 2016; **Published:** Oct 04, 2016; **Paper Id.:** JASRDEC20164