

**EFFECTS OF VETIVER GRASS STRIPS, VETIVER GRASS MULCH
AND AN ORGANOMINERAL FERTILIZER ON SOIL, WATER, AND
NUTRIENT LOSSES AND MAIZE YIELDS ON AN ALFISOL**

Babalola OlaOLU

ABSTRACT

Soil erosion still remains a menace to be conquered on agricultural fields. Experiments were conducted to test the efficiency and efficacy of using vetiver grass strip (VGS), vetiver grass mulch (VGM) and an agronomic practice of using an organomineral fertilizer (OMF) capable of improving soil structure, in soil and water conservation and improvement of crop yields. Soil physical conditions in terms of soil bulk density, soil organic matter and soil infiltration characteristics were significantly affected by treatments. Soil conditions were best under VGM plots and least under VGS plots. Nevertheless, runoff and soil loss were generally in the increasing order of VGS, VGM and OMF. Although runoff and soil loss on VGS plots were reduced by 228.5% and 253% respectively over a control plot, with the application of 2 tons of vetiver grass mulch, these values were reduced to 61.7% and 102.6%, respectively. VGM was more effective than VGS in reducing runoff than soil loss at 6tons/ha of grass mulch when VGM reduced runoff by 34.1% over VGS. Mean soil losses were 66.9 and 152% lower on VGS than VGM plots at 4 and 6tons/ha, respectively. Mean NO₃-N levels in runoff water were significantly affected by treatments. Mean NO₃-N levels in runoff water were 52.5% and 147.5% higher on the control and OMF plots, respectively than VGS plots. Nutrient (macronutrients and micronutrients) loads of eroded sediments were highest for OMF plots and least for VGS plots. Carbon, Nitrogen and P contents of eroded sediments on VGS plots were 22 to 23.5%, 12% to 35.9%, and 20.6 – 37.6% lower on VGS plots than other treatments. The corresponding figures for mean total base content (Ca, Mg, Na & K) and for mean micronutrient contents (Fe, Cu, Zn and Mn) were 9.5 to 37.5% and 4.9 to 22.0%, respectively.

The significant beneficial effect of OMF in producing the highest yields was dwarfed by the potential danger of water pollution by nutrient loads in the absence of a soil erosion control measure. Although the differences were not significant, grain yields on vetiver grass mulched plots (VGM) were 4% and 47.4% higher than on VGS plots when 4 and 6tons/ha of grass mulch were applied. For maximum benefits, VGS and VGM should be combined from the standpoint of soil, water and nutrient conservation and improved crop yields.