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PREDICTION OF THE EFFECT OF SLOPE AND RUN-OFF ON EROSION RATE

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ABSTRACT

The field measurements were used to calculate the discharge using hydraulic equations. The calculated discharges with limited hydraulic data were then used to establish erosion rate equation i.e. $E = 0.025 (1.022Q)^{15/8} L^{3/8} So^{3/2}$ ($Kg/m^2/hr$) which was used to estimate erosion rate. The effect of different levels of discharges and different degrees of steepness of slope were established . The result of erosion rate against the discharge were plotted for different degrees of slope from 1% - 6%. From all the derived power equations, it is clear that there is a perfect fit and the coefficient of determination (R^2) revealed that 100 percent of variation in the dependent variable (erosion rate) was due to the independent variable (discharge). The discharge was found to be significantly influencing the erosion rate even for the different degrees of steepness of slope. The higher the discharge and slope the higher the erosion rate. The slope also was found to be significantly influencing the erosion rate even for the different levels of discharge. The higher the slope the higher the erosion rate for the different levels of discharge. It was observed that only derived equation for discharge of 8 cumecs is a linear function i.e. (E= 6*10^13S7*10^13), while the rest rate are power equations. The combined effects of discharge and slospe on erosion rate predication were highly correlated with r = 97% and r^2 = 95% and the equation of the form $E = 0.0003Q^{2.57} S^{0.74}$

Keywords: Discharge, erosion rate, slope, power equations, multiple regression.