

# Impact of Two Natural Rainfall Events in Erosion of Soil, Water and Nutrients in a Wasteland Area of Bundelkhand Region (U.P.) India

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**Abstract**— Present investigation has been carried out at two selected sites (I & II) in a wasteland area of Orai (Jalaun), Uttar Pradesh to see the impact of erosion on soil, water and nutrients in two natural rainfall events i.e. 14 and 11 mm on two different days during rainy season. The vegetated plot showed lower values of soil erosion, run-off water and nutrient loss and high infiltration rate in comparison to bare plot at both the sites (I & II). It was observed that the loss of soil, water and nutrients (N and P) were more at site I in comparison to site II. The annual soil loss in total rainfall (1146.6 mm) of the year during study period (2016) was 2.01 t/ha/yr in vegetated and 24.86 t/ha/yr in bare plots at site I. In contrast, values were 1.74 t/ha/yr in vegetated and 23.73 t/ha/yr in bare plots at site II.

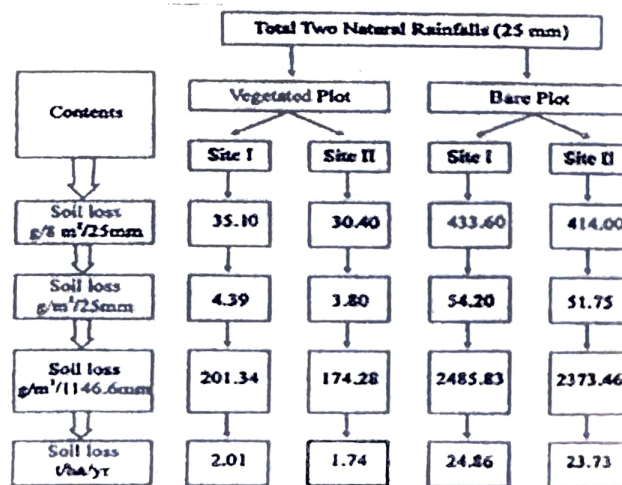
**Keywords:** Erosion, Run-off, Rainfall

## 1 INTRODUCTION

In Bundelkhand region wasteland is more or less fragile and delicately balanced. The vegetation of present study sites (I & II) are not very rich in plant diversity. In recent years due to increase in anthropogenic activities, the quality of soil on such land has suffered enormously by erosion. Therefore, it has attracted the attention of ecologists to explore the habitat with the problem of erosion. Eroded sediments are generally composed of aggregates and primary particles with different size or settling velocity characteristics (Meyer *et al.*, 1975; Loch and Donnolan, 1982; Spink *et al.*, 1998). Clay fraction of the soil is the site of nutrients and chemical adsorption (Young and Onstad, 1976; Frere *et al.*, 1977). Soil clays can either be transported in primary or aggregated form (Young and Onstad, 1978; Foster, 1979). The soil loss is generally governed by the raindrop energy (Ellison, 1952). Rainfall intensity greatly affects the rate of soil detachment splash and run-off. The effect of soil erosion on physical properties of soil, soil types, soil profile and nutrient status has been discussed by Ekern (1950); Kowal (1970 a,b; 1972) and Lal (1976). Infiltration on the slopes in response to rainfall has been studied by Romkens *et al.*, (1986).

Jones and Richards (1977) suggested that concentration of nitrate nitrogen in run-off water also depends on growth stage of vegetation. The role of vegetation to conserve soil and nutrients at wetland margins have been given by Singh and Ambasht (1990); Ambasht (1992, 1995); Ambasht and Ambasht (2003). Syers *et al.*, (1973); Barrow (1978); Parfitt (1978) showed that phosphorus transport was greatly through water. This is mainly because of organic matter transported, contains relatively high level of phosphorus (Burwell *et al.*, 1979; Nelson *et al.*, 1979).

The present sites are situated at wasteland in district of Jalaun at Orai, U.P., India. There was about 90% of rainfall during the rainy season, in the experimental year 2016. The intensity and duration of rainfall events at the study sites are much responsible for the loss of water, soil and nutrients and plays important role in the stability of the ecosystem. Therefore, the present study has been conducted to see the impact of natural rainfall events (with different intensities and durations) during rainy season in vegetated cover and bare areas, which resulted the loss of soil, water and nutrients.



Model 1. Annual Soil loss (on/ha/yr.) at two study sites (I&II) Computed on the basis of total two natural rainfall (25 mm)