

IMPACT OF NATURAL RAINFALL ON SOIL, WATER AND NUTRIENTS CONSERVATION BY VEGETATIONAL COVER AT A NEGLECTED WETLAND ECOTONE OF RIVER GOMATI

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ABSTRACT

The riparian wetlands are narrow typical ecotone in between river water and upland terrestrial systems. They are under the constant flux of seasonally changing hydroperiod and anthropogenic activities. In view of this, the present paper summarizes our findings under a natural rainfall event (in 13 mm, 45 minutes and 140 slope) in vegetated and bare conditions of a neglected wetland ecotone of R. Gomati in Jaunpur (U.P.) during the rainy season. The conservation values (Cv%) varied from 67.26 to 94.35 %. In contrast, the annual loss of nutrients (nitrogen-N and phosphorus-P) in total rainfall (882mm) during the study period (April, 2012 to March, 2013) revealed that the total N and P in the respective vegetated plot was less than (N=0.0065 and P=0.0012 t ha⁻¹ yr⁻¹) compared to bare plot (N=0.0844 and P=0.0094 t ha⁻¹ yr⁻¹).

KEYWORDS : Conservation, Ecotone, Neglected, Riparian, Vegetated and Bare Plots, Wetland

River banks are referred as Riparian (derived from the Latin word Rip meaning bank of stream or river and are ecologically well defined landscapes with ecotonal properties of both the wetland and dry lands (Ambasht et al., 1995). Wetland, as the name suggests, refers to such landscape which is saturated with water or covered with water either perennially or for major part of the year. The transition zone between the two adjacent plant communities is referred as ecotone (Ambasht et al., 2003). Tropical wetland ecotones are rich in plant diversity and perform a number of functions, including the role of conservation against erosion (Ambasht et al., 1984; Kumar et al., 1992 a, b & 1996; Singh et al., 2011).

The soil loss is generally governed by raindrop energy (Ellison, 1952). The nutrient movement is both by eroding soil and run-off water. (Heathman et al., 1985) had tried to investigate the process involved in releasing plant nutrients in run-off water from surface and sub-surface soil. The transport of nutrients through soil erosion down the riparian land causes direct loss of bulk of nutrients through soil erosion down the riparian land and truncation of top soil (Rose and Dalal, 1988).

Therefore, the present experimental study has been conducted for the first time to see the impact of a natural rainfall event during rainy season in vegetal cover and bare areas on a neglected riparian zone of R. Gomati in Jaunpur (25°44' to 25°45'N lat. 82°42' to 82°43'E long.) eastern U.P.

MATERIALS AND METHODS

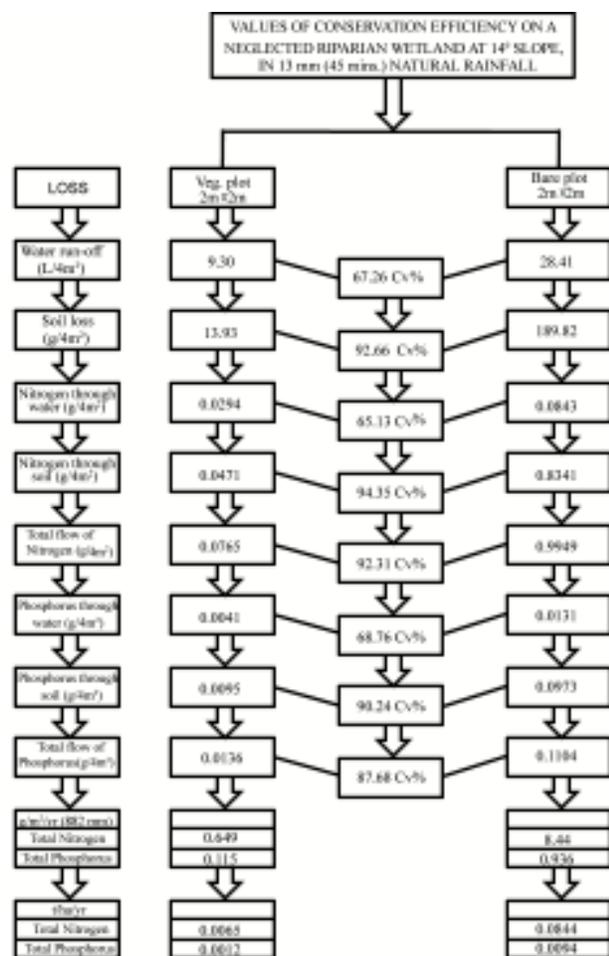
The present study was conducted on a neglected or abandoned upper riparian zone (50×200m) of R. Gomati at 'Rouza Ghat' in the 13 mm (45 minutes) natural rainfall event in a day during the month of August, 2012 by paired plot technique (vegetated and bare plots) each of 2×2 m size applied by (Singh et al., 2011), Sinha and Singh (2012). The total rainfall for the year (April, 2012 to March, 2013) recorded near the study site was 882 mm out of which 310.2 mm was in August. The vegetated cover of upper zone river ecotone was dominated by *Cynodon dactylon* (Linn.) Pers (Poaceae) among monocots and *Parthenium hysterophorus* Linn. (Asteraceae), a dicot that grows gregariously reaching a height of 50-100 cm. The following formula (Ambasht, Singh and Sharma, 1984) was used to calculate soil, water and nutrient's conservation value (Cv) of vegetated and bare plots.

$$\%Cv = 100(1 - S_p/S_0)$$

Where, %Cv = percentage conservation value, S_p = quantity of soil or volume of water running down from vegetated plot and S₀ = the weight of soil or volume of water from the bare plot.

In eroded soil, total nitrogen analysis was performed by using the micro-Kjeldhal method (Peach and Tracey, 1965; Misra, 1968) and available phosphorus was determined by chlorostannous reduced molybdophosphoric blue colour in hydrochloric acid (Jackson, 1967). In runoff water, total nitrogen and phosphorus were estimated by using the method described by APHA, 1985.

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Model 1: Conservation Efficiency (%Cv) of Soil, Water and Nutrients (N and P) by Plant Community at a Neglected Riparian Wetland During Natural Rainfall

RESULTS AND DISCUSSION

On perusal of Model 1, the results of present findings in 13mm natural rainfall (45 minutes) clears that Cv% varied in plots from 67.26 to 92.66%. The values of soil, water and nutrients (N = 0.0065 t ha⁻¹ yr⁻¹ and P = 0.0012 t ha⁻¹ yr⁻¹) loss were less in a vegetated plot compared to bare plot (N = 0.0844 t ha⁻¹ yr⁻¹ and P = 0.0094 t ha⁻¹ yr⁻¹). The annual soil loss in vegetated plot (1.18 t ha⁻¹ yr⁻¹) was also less in comparison to bare plot (16.10 t ha⁻¹ yr⁻¹). It was computed based on total rainfall (882mm) during the experimental years (April, 2012 to March, 2013). It clearly indicates that vegetational cover protects the soil, water and nutrients from heavy impact of raindrops.

Findings of present study are largely in accordance with (Ambasht et al., 2003; Singh et al., 2011

and Sinha and Singh, 2012). This clearly suggests that wetland's ecotone usefulness and sustainability depends upon preservation of plant diversity that will undoubtedly encourage National Development Policies of the country by vegetational cover and afforestation.

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