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Soil erosion assessment from farming lands of Eastern Ghat region of Odisha

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ABSTRACT

Soil erosion from crop lands of Koraput district in Eastern Ghat region of Odisha was estimated using the Universal Soil Loss Equation (USLE). Using rainfall for the period (1986 to 2012), monthly and annual values of rainfall erosivity or erosion index unit (R) were determined. Average monthly value of R was found ranging from 6.94 MJ mm $ha^{-1}hr^{-1}$ (January) to 184.43 MJ mm $ha^{-1}hr^{-1}$ (July). The annual value of R was found maximum (1265.74 MJ mm $ha^{-1}hr^{-1}$) in 1990 and minimum (494.85 MJ mm $ha^{-1}hr^{-1}$) in 2009 with an average value of 755.36 MJ mm $ha^{-1}hr^{-1}$ indicating higher erosivity (>700 MJ mm $ha^{-1}hr^{-1}$). It was observed that 13333.35 thousand tonnes of soil was lost annually from the cultivable area of the district at the rate of 43.86 t $ha^{-1}yr^{-1}$. Soil loss was found highest (98.38 t $ha^{-1}yr^{-1}$) in case of fallow land and major portion of soil loss occurred from cropping sequence finger millet-fallow-fallow (20.4%), rice-fallow-fallow (19.9%), niger-fallow-fallow (14.5%) and fallow land (10.5%). Highest rate of soil loss was observed from cultivation of green gram (68.53 t $ha^{-1}yr^{-1}$) followed by black gram (68.48 t $ha^{-1}yr^{-1}$), maize (58.61 t $ha^{-1}yr^{-1}$) and niger (50.64 t $ha^{-1}yr^{-1}$). This may be due to mono-cropping on upland farming situation, thin canopy, weak soil binding by crop roots, more erodibility and erosivity in the peak soil-eroding season from June to September and fallow state of crop lands. From double cropped land, 70% less soil loss was observed when compared with single cropped land and it may be due to mild sloping conditions of crop lands, less erodibility and erosivity, good canopy due to favourable soil moisture and short fallow period. Soil loss from ginger and turmeric field was found proportionately less *i.e.*, 30.57 and 35.41 t $ha^{-1}yr^{-1}$, respectively due to longer crop period than other crops. High rainfall, more upland area, undulating topography, mono cropping and fallow crop fields are seemed to be the major causes of soil loss and land degradation in Koraput district.