where E is the soil erosion (t ha^{-1} yr^{-1}), R is the rainfall erosivity (MJ mm ha^{-1} h^{-1} yr^{-1}) factor, K is the soil erodibility (Mg ha h MJ^{-1} ha^{-1} mm^{-1}) factor, L is the slope length factor, S is the slope steepness factor, C is the land cover and management factor, and P is the soil conservation or prevention practice factor.

The R factor was calculated using the method of Xie et al., (2016) with the daily rainfall data of CHM_PRE. Daily rainfall erosivity was estimated using a power-law model with a sinusoidal monthly term to reflect seasonal variation in rainfall erosivity (Xie et al., 2016):

$$R_{day} = 0.2686\left[1 + 0.5412\,cos\left(\frac{\pi}{6}j - \frac{7\pi}{6}\right)\right]P_d^{1.7265} \quad (2)$$

where R_{day} (MJ mm ha^{-1} h^{-1} yr^{-1}) is daily rainfall erosivity; j is the month of the year from 1 to 12; P_d (mm) is the daily effective rainfall ($\geq$ 9.7 mm).

The K factor was calculated according to the recommendations of the erosion-productivity impact calculator (EPIC) model (Sharpley and Williams, 1990).

$$K = 0.1317 \cdot (0.2 + 0.3 \cdot e^{[-0.0256 \cdot San \cdot (1 - \frac{Sil}{100})]}) \cdot (\frac{Sil}{Cla + Sil})^{0.3}$$
$$\cdot [1 - \frac{0.25 \cdot TOC}{TOC + e^{(3.72 - 2.95 \cdot TOC)}}] \cdot [1 - \frac{0.7 \cdot SN_1}{SN_1 + e^{(22.9 \cdot SN_1 - 5.51)}}] \quad (3)$$

where K (t ha h MJ^{-1} mm^{-1} ha^{-1}) is the soil erodibility; *San* (%) is the sand content (0.05–2 mm); *Sil* (%) is the silt content (0.002–0.05 mm); *Cla* (%) is the clay content (< 0.002 mm); *TOC* (%) is the soil total organic carbon content; and SN_1 = 1-*San*/100. For soil with organic matter content (TOC = SOM × 0.58) above 4%, the upper limit of 4% has been applied, to prohibit an underestimation of soil erodibility (Panagos et al., 2015; Wischmeier and Smith, 1978).

The *LS* factor was calculated using the method developed by Böhner and Selige (2006) in SAGA-Analyses and modelling applications. Firstly, DEM should be filled sinks in ArcGIS using Fill tool. Then Flow Accumulation tool is used to calculate total Catchment Area (TCA) in ASGA, and Flow Width and Specific Catchment Area tool is used to calculate Specific Catchment Area (SCA). Finally, SAGA's LS Factor tool was used to calculate the *LS* factor (Schürz et al., 2020). To reduce topographic information loss from direct DEM coarsening, the *LS* factor was calculated at 30 m resolution and subsequently resampled to the common 100 m modelling grid. The C factor was derived from monthly NDVI using the exponential relationship proposed by van der Knijff et al. (2000):

$$C = exp\left[\alpha\left(\frac{NDVI}{\beta - NDVI}\right)\right] \quad (4)$$

where α = -2 and β = 1. The monthly NDVI-derived C factor captures temporal variations in vegetation cover and therefore reflects seasonal and interannual effects of vegetation cover on soil erosion (Benavidez et al., 2018). Thus, the vegetation-cover dynamics associated with ecological restoration, including the "Grain for Green" Program, can be represented by the C factor.

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