

## PAPER (7)

### Assessment of Various Empirical Soil Loss Estimation Equations in Arid Regions.

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#### Abstract

One of the most commonly used equations to estimate soil erosion is the revised universal soil loss equation (RUSLE). Based on the early approach developed by the Soil Conservation Service of USA, the rainfall erosivity factor (R-factor) in the RUSLE equation requires sub-daily rainfall data, which is usually not available. Other empirical equations estimate R-factor based on available rainfall data like annual and monthly rainfall data. In arid regions such as the Arabian Peninsula, several studies estimated the R-factor based on these empirical equations without calibration. We propose in this paper to assess the applicability of some of these empirical equations against R-factor values calculated using as a reference the RUSLE approach. For this data, data from 104 stations with sub-daily rainfall was collected. The reference R-factor was calculated for the 104 stations. The results of seven empirical equations were tested against the reference R-factor. Most of the tested equations significantly underestimated the R-factor. Furthermore, the obtained RMSE and MAE values were almost as high as the average R-factor, with MAPE exceeding 100%. Therefore, it is recommended not to apply these equations in arid regions. A recalibration of the form of equation that gave the best results, gave an RMSE of 280 (Mj·mm/(ha·hr)) and the MAPE dropped to 47.6%.