Environmental Engineering and Management Journal

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ASSESMENT OF SOIL ERODIBILITY PREDICTED BY MACHINE LEARNING AND MULTI LINEAR REGRESSION APPROACH IN SEMI-HUMID CLIMATE CONDITIONS

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Abstract

Erosion is an important ecological problem that reduces soil fertility, pollutes water resources, and destroys plant vegetation. The first step in controlling erosion is to estimate the erosion risk and soil loss of land. Soil erodibility (K factor) is an important component used in the estimation of soil loss and indicates the soil's susceptibility to erosion. Recent years have seen a focus on new approaches for estimating the K factor. This study aimed to see how well artificial neural networks (ANNs) and multiple linear regression (MLR) methods can predict the K factor in an area at high risk of erosion. A total of 428 soil samples were taken from the study area of 10 626.9 ha. The soil was analysed, and the K factor was determined using the equations given in the RUSLE method. The potential variables used in ANN and MLR methods were determined by correlation analysis, and the data set was prepared. In the study, the effectiveness of the models was measured using R^2, RMSE, MSE, and MAPE. The obtained results indicated that both models performed successfully. R^2 values for ANN and MLR are 0.95 and 0.92, RMSE values are 0.03141 and 0.052135, and MAPE values are 4.58% and 9.68%, respectively. These results indicate that ANN produces a better result than MLR. We need to conduct further studies on the variables to achieve higher accuracy and a lower modelling error. This study's results provide strong evidence that basins with similar characteristics can predict the K factor using both models.

Key words: artificial neural networks, erosion, machine learning, multiple linear regression, soil erodibility, soil management

Received: May, 2025; Revised final: August, 2025; Accepted: October, 2025