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Suspended sediment load estimation using neuro-fuzzy and multiple linear regression: Vamsadhara River Basin, India

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■ **ABSTRACT :** Soil erosion by water is the most serious form of land degradation resulting in loss of crop productivity by 0.2-10.9 q/ha (66% total production loss) for cereals, 0.1-6.3 q/ha for oilseeds (21% total production loss) and 0.04-4.4 q/ha for pulses (13% total production loss) estimated across states, which has a direct bearing on food security of the country. Therefore, a major challenge still remaining is the accurate prediction of the catchment sediment yield responses to the rainfall-runoff events. One viable approach to this challenge is the use of suitable statistical and soft-computing techniques for the efficient management of watersheds and ecosystems. The present study deals with the development of adaptive neuro-fuzzy inference system (ANFIS) and multiple linear regression (MLR) models to estimate the suspended sediment load from Vamsadhara river catchment comprising of 7820 km^2, situated between Mahanadi and Godavari river basins in south India. Considering the active monsoon period, 70% data were used for model calibration and remaining 30% data were used for model validation. Results revealed that the Neuro-Fuzzy models are in good agreement with the observed values and present better performance in comparison to the statistical models.

■ **KEY WORDS :** Adaptive neuro-fuzzy inference system, Multiple linear regression, Calibration, Validation, Soft-computing

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