Application of Artificial Intelligence to Estimate the Reference Evapotranspiration at North Bihar, India

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Abstract: This paper estimates the reference evapotranspiration on daily basis and to develop the models using various training functions of Artificial Neural Network (ANN). The potential of ANN is investigated in modeling of daily reference evapotranspiration obtained using standard Penman-Monteith equation. The study compares results obtained using mean absolute error, root mean square error, coefficient of determination and Mean absolute percentage error statics used as criteria for evaluation of model performance. The major objective of this study was to estimate daily reference evapotranspiration using an artificial neural network technique with LM, GDM and OSS learning algorithms and compares if a trained neural network with limited input variables can estimate reference evapotranspiration (ET_o) efficiently. The comparison results indicate that the LM training function is faster and has a better accuracy than GDM and OSS. The value of coefficient of determination for LM, GDM and OSS function is 0.960, 0.959 and 0.949 respectively. LM produced high value of determination coefficient and lower value of root mean square error rather than other two training functions. So it is considered as best model for reference evapotranspiration estimation in Pusa.

Keywords: ANN, Levenberg- Marquardt, Reference evapotranspiration, Penman-Monteith equation