POTENTIAL EVAPOTRANSPIRATION ESTIMATION FROM PICHE EVAPORIMETER MEASUREMENTS BASED ON ADAPTIVE NEURO FUZZY INFERENCE SYSTEM TECHNIQUE

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ABSTRACT

There are different manners of estimating potential evapotranspiration (PET); physical and empirical methods as well as special devices like pan evaporation and Piche evaporimeter. Using Piche evaporimeter data, the aim of this paper is to compare the Adaptive Neuro-Fuzzy Inference System (ANFIS) technique and empirical equations for good estimation of daily potential evapotranspiration. Piche evaporation, relative humidity and wind speed, have been used as inputs. The values of reference evapotranspiration (ETo) estimated by the Penman-Monteith equation have been used as outputs. Results showed that the ANFIS models could provide more accurate ETo estimates than empirical methods. Thus, performance criteria of the best ANFIS model are: 0.96, 0.91, 0.78 (mm/day), 0.62 (mm/day) and 8.19 %, respectively for correlation coefficient (R), Nash-Sutcliffe efficiency (E), root mean squared error (RMSE), mean absolute error (MAE) and mean absolute relative error (MARE). This model is more useful when some meteorological parameters as temperature (T) and sunshine duration (I) are not available.

Key words: Adaptive Neuro-Fuzzy Inference System, Empirical methods, Piche evaporimeter, Potential Evapotranspiration.