

Title: A review of recent advances and future prospects in calculation of reference evapotranspiration in Bangladesh using soft computing models

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Abstract: [Evapotranspiration](#) (ETo) is a complex and non-linear hydrological process with a significant impact on efficient [water resource](#) planning and long-term management. The Penman-Monteith (PM) equation method, developed by the [Food and Agriculture Organization](#) of the United Nations (FAO), represents an advancement over earlier approaches for estimating ETo. Eto though reliable, [faces](#) limitations due to the requirement for climatological data not always available at specific locations. To address this, researchers have explored soft computing (SC) models as alternatives to conventional methods, known for their exceptional accuracy across disciplines. This critical review aims to enhance understanding of cutting-edge SC frameworks for ETo estimation, highlighting advancements in evolutionary models, hybrid and ensemble approaches, and optimization strategies. Recent applications of SC in various [climatic zones](#) in Bangladesh are evaluated, with the order of preference being ANFIS > Bi-LSTM > RT > DENFIS > SVR-PSOGWO > PSO-HFS due to their consistently high accuracy (RMSE and). This review introduces a benchmark for incorporating evolutionary computation algorithms (EC) into [ETo modeling](#). Each subsection addresses the strengths and weaknesses of known SC models, offering valuable insights. The review serves as a valuable resource for experienced [water resource](#) engineers and hydrologists, both domestically and internationally, providing comprehensive SC modeling studies for ETo forecasting. Furthermore, it provides an improved water resources monitoring and management plans.

Keywords: Evapotranspiration (ETo) , Penman-Monteith (PM) equation, Soft Computing (SC) models, Evolutionary Computation (EC), Hybrid and Ensemble Approaches, Optimization Techniques, Machine Learning Models (ANFIS, Bi-LSTM, SVR-PSOGWO), Water Resource Management.

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