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## Partitioning of daily evapotranspiration using a modified shuttleworthwallace model, random Forest and support vector regression, for a cabbage farmland

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Prediction of vegetation transpiration (T) is of increasing importance in water resources management and agricultural practices, in particular to facilitate precision irrigation. Traditional evapotranspiration (ET) partitioning dual source modeling requires an extensive array of ground-level parameters and needs model correction and calibration to attain model certainty. In response, a quick and low-cost method is described to predict T using artificial intelligence (AI) modeling based on meteorological factors, status of crop growth factors and soil parameters. This study compares Random Forest (RF) and Support Vector Regression (SVR) in building AI models using three years (2014–2017) of continuous high-resolution monitoring data in a cabbage farmland. Input data included air temperature (Ta), solar radiation (Ra), relative humidity (RH), vapor pressure deficit (VPD), wind speed (Ws), soil moisture (SM), vegetation height (H), and leaf area index (LAI). The results show that soil surface resistance calculations by Monte Carlo iterative method and vegetation stomatal resistance calculations and carbon dioxide concentration and emission, improve performance of the original Shuttleworth–Wallace (S-W) model. In addition, the AI model indicates Ta and Ra are essential inputs for both model types. When there are sufficient observation data, or only lacking soil and vegetation data, the RF model is recommended for use. When there are only limited data or lack of critical Ta and Ra data, the SVR model is the preferred model. Scientific guidance is provided for agriculture precision irrigation, indicating which AI model can best estimate T and water demand for irrigation planning and water management.