

Corn Irrigation Scheduling by using TSEB and UAV Images

Emre TUNCA^{1,*}, İhsan Buğra Buğdaycı², Durmuş Ali Kipritci², Şafak Ceylan²

¹Düzce University, Biosystem Engineering, Düzce, Turkey.

²Soil, Water and Deserting Control Research Institute, Konya, Turkey

*Correspondence address: emretunca@duzce.edu.tr.

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OPTIMIZING IRRIGATION SCHEDULING IS ESSENTIAL FOR SUSTAINABLE AGRICULTURAL WATER MANAGEMENT, PARTICULARLY IN REGIONS WHERE FACING WATER SCARCITY. THIS STUDY EXPLORES THE APPLICATION OF HIGH-RESOLUTION UNMANNED AERIAL VEHICLE (UAV) IMAGERY, EQUIPPED WITH MULTISPECTRAL AND THERMAL SENSORS, TO OPTIMIZE IRRIGATION SCHEDULING FOR CORN IN KONYA, TURKEY. THE TWO-SOURCE ENERGY BALANCE (TSEB) MODEL WAS UTILIZED TO ESTIMATE DAILY EVAPOTRANSPIRATION (ET) BASED ON UAV-DERIVED DATA. WEEKLY UAV FLIGHTS WERE CONDUCTED, AND DAILY ET VALUES WERE INTERPOLATED BETWEEN FLIGHT DATES, CUMULATIVELY SUMMED, AND USED TO DETERMINE IRRIGATION REQUIREMENTS. THE UAV-BASED TSEB APPROACH WAS COMPARED WITH THE CONVENTIONAL SOIL WATER BALANCE (SWB) METHOD FOR ET ESTIMATION. RESULTS REVEALED NO STATISTICALLY SIGNIFICANT DIFFERENCES IN SEASONAL IRRIGATION AMOUNTS (645.8 MM FOR SWB VS. 568.7 MM FOR TSEB) OR CROP YIELDS (17.30 TONS/HA FOR SWB VS. 16.91 TONS/HA FOR TSEB) BETWEEN THE TWO METHODS. THESE FINDINGS DEMONSTRATE THAT UAV-BASED IRRIGATION SCHEDULING IS AS EFFECTIVE AS TRADITIONAL APPROACHES, PROVIDING ADDITIONAL BENEFITS SUCH AS HIGH SPATIAL RESOLUTION AND NON-INVASIVE MONITORING. THEREFORE, UAV-BASED IRRIGATION SCHEDULES OFFER VALUABLE INSIGHTS FOR SUSTAINABLE WATER MANAGEMENT IN AGRICULTURE.