## Abstract

**Limited fresh water resources on the one hand and the need to feed the world's growing population on the other hand, The need to take efficient irrigation methods and use of unconventional water resources with the aim of achieving water security and food combinations is necessary. Incomplete irrigation roots, one of the modern methods of irrigation in recent years due to differences in methods of irrigation in this way, is expected to be achieved different results in comparison to conventional irrigation. In this study, the HYDRUS-2D physical model to simulate water balance components and plant model simulation SALTMED the possibility of imposing economic performance plants to analyze the effects of deficit irrigation with saline water on sunflower roots were investigated. The data required for calibration and Recovery models over the past two seasons, the farm Sari University of Agricultural Sciences and Natural Resources were collected. In order to assess the performance of the model SALTMED amounts of leaf area index, biomass at the end of the growing season and yield during the growing season 1393 were used to calibrate the model. Results showed that irrigation treatments model error is very low. In order to calibrate the model HYDRUS-2D, the sensitivity analysis was performed to determine the most sensitive parameter. The results showed small amounts of error of less than 10 mm in estimating the water balance components is HYDRUS-2D model. After calibration and validation of models SALTMED and HYDRUS-2D, different management scenarios combining different irrigation depth, salinity and salt water was a period in the periodic acts. After determining the different management scenarios, SALTMED and HYDRUS-2D models used to estimate the yield and crop evapotranspiration during the growing season for each state determines how it was run. Then, the amount of water use efficiency in each scenario by dividing the yield on evapotranspiration, respectively.**

**Key words: Saline Water, HYDRUS- 2D, SALTMED, Sunflower**

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# Simulating Soil Water Balance Components and Sunflower Yield under Partial Root-zone Drying Using Crop and Physical Models

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