

## Soil water content simulation under different irrigation and nitrogen strategies using AquaCrop model

**Authors:**

Sayyed Mohammad Javad Mirzaei<sup>1</sup>,  
Mojtaba Khoshravesh<sup>2</sup>,  
Ali-Reza Kiani<sup>3</sup> and Reza Norooz Valashedi<sup>4</sup>

**Institution:**

1. Assistant Professor, Water Engineering Department, Faculty of Agriculture and Animal Science, University of Torbat-e Jam, Torbat-e Jam, Iran.

2. Assistant Professor, Water Engineering Department, Sari Agricultural Sciences and Natural Resources University, Sari, Iran

3. Professor of Irrigation and Drainage, Agricultural Engineering Research Department, Golestan Agricultural and Natural Resources Research and Education Center, Gorgan, Iran.

4. Assistant Professor in Agrometeorology, Water Engineering Department, Sari Agricultural Sciences and Natural Resources University, Sari, Iran.

**Corresponding author:**

Sayyed Mohammad Javad Mirzaei

**ABSTRACT:**

The purpose of this research was to study the efficiency and accuracy of Aqua Crop model, in estimating soil moisture and soybean crop water consumption based on Evapotranspiration (ET). A field sprinkler irrigation system was conducted under full and deficit irrigation using different nitrogen fertilizer applications (40%, 80%, and 100%) during two cropping seasons for soybean at Gorgan province in Iran. The simulation results showed a reasonably accurate prediction of soil moisture content and actual crop Evapotranspiration (ETc) under different irrigation water application and nitrogen treatments. The Root Mean Square Error (RMSE) of ETc estimation for calibration and validation sets were 14.5 mm and 23.2 mm, respectively. Based on optimization, the required amount of irrigation water to achieve optimum WUE was equal to 200 mm and 275 mm for the first and second year of study, respectively. The simulated soil moisture data can be used in subsequent studies to develop a drought indicator for agricultural drought monitoring.

**Keywords:**

Soil moisture contents, Evapotranspiration, Deficit irrigation, Water use efficiency, Soybeans.