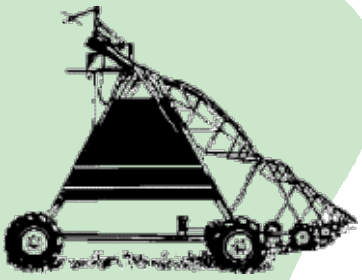


Irrigation Scheduling Tools

MICHIGAN STATE UNIVERSITY | Extension

PURDUE UNIVERSITY | Extension

Irrigation Fact Sheet
Updated June 2025

Co-Authors:
Lyndon Kelley,
Extension Irrigation Educator, MSU Extension/Purdue Extension
kelleyl@msu.edu
269/467-5511

Younsuk Dong,
Assistant Professor and Irrigation Specialist
Biosystem and Agricultural Engineering
dongyoun@msu.edu

Angie Gradiz
Agriculture Water Use Efficiency and Irrigation Extension Educator, MSU Extension
gradizme@msu.edu
517/279-4311

Electronic version is available at:

Irrigation scheduling provides information on the timing and amount of water to apply to meet crop needs. “Checkbook” irrigation scheduling-confirmed with soil moisture monitoring-can improve irrigation efficiency. Checkbook scheduling is discussed below.

The checkbook method of irrigation scheduling assumes the soil in your field is like a bank checking account. Rainfall and irrigation make deposits into the account. Daily water removal from evaporation and transpiration (evapotranspiration or ET) are considered withdrawals from the account. Soil has a maximum amount of water that can be held (called Field Capacity). Water added beyond the soil’s water holding capacity is lost to the account. Irrigation applied at a rate exceeding the infiltration capacity will cause surface runoff and be lost to the soil water balance account.

Five different checkbook irrigation scheduling tools are available through Purdue and MSU Extension:

Enviroweather estimates daily potential ET and forecasts ET demands for the upcoming week at each of the 94 strategically located weather stations. ET is estimated using wind, relative humidity, and net solar radiation in addition to temperature. To get ET estimates, visit the Enviroweather website. Pick the station nearest to you, and then click on one of the categories listed near the top of the screen (eg. Field crops, Fruit), then click on Potential Evapotranspiration. For corn and soybeans, click the Crop ET Estimate button and then enter the date of the emergence. This allows you to track ET as the crop develops.

The MSU Soil Water Balance Sheet is a paper version of a checkbook scheduler. Producers can use potential reference evapotranspiration rPET data from their own ET gauge station or rPET data from Purdue’s PET monitoring tool. For Michigan, producers can use the Enviroweather data described above. The Soil Water Balance Sheet helps producers convert the rPET into crop water use for either corn or soybeans. The Soil Water Balance Sheet is available at the MSU Irrigation Resources website. Scroll down to “Irrigation Resources Developed by Lyndon Kelley and click on “Soil Water Balance Sheet” (pdf).

The MSU Excel Version of Scheduler allows greater flexibility and adaptability for irrigators who are comfortable using Excel. This method will provide results for all of Michigan and the upper tier counties in Indiana. Reference crop ET can be taken from each of the Enviroweather stations. The program will then adjust these using crop specific coefficient to adjust for your crop’s stage of growth. The MSU Excel version of Scheduler is available at MSU Extension Irrigation.

Irrigation Scheduler is a simple computerized irrigation scheduling checkbook model from the Agronomy Department of Purdue University. This method can be used throughout Michigan and Indiana. Crop specific ET values are estimated using the daily high and low temperatures and rainfall provided by the producer. Alternatively, weather data can be imported from the internet. You can access the Irrigation Scheduler at: Purdue Irrigation Scheduler.

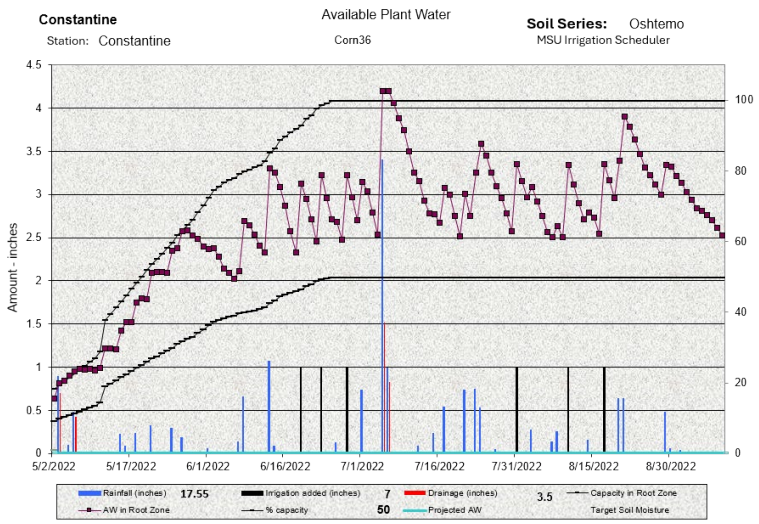
Irrigation Scheduler App - IrrigMSU is a mobile irrigation scheduling app, designed as a refined and user-friendly adaptation of the MSU Scheduler- Excel Version. This app integrates rPET from the Michigan State University Enviroweather Network, specific crop coefficients, soil types, emergence dates, and growing degree days. The app provides timely information on crop water needs and recommended irrigation application amounts. Moreover, this app provides the available water-holding capacity for common Michigan soil types as supplemental information. Users can choose to get notifications that alert them when soil moisture drops below a selected threshold. App is available on both Android and Apple stores. The QR code for free download can be found at the bottom of the page.

Soil Moisture Sensors are an alternative tool that provides measures of soil moisture content. With a wide array of soil moisture sensors available, each employing different operational methods, users have the flexibility to choose the most suitable option for their needs. When combined with the Irrigation Scheduler methods mentioned above, soil moisture sensors can provide better insights into soil moisture content. For more details about soil moisture sensors, interested readers can find more information from E3445 - Improving Irrigation Water Use Efficiency: Using Soil Moisture Sensors.

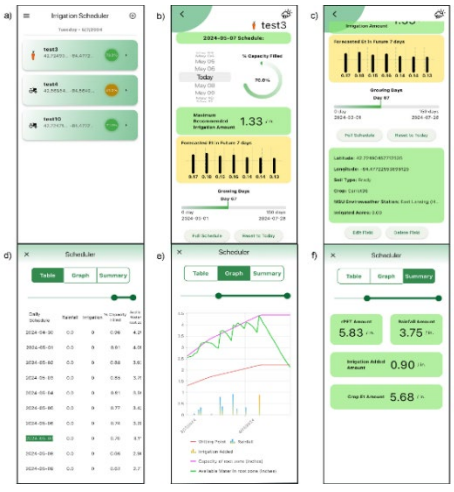
Conversion of inches to gallons for trickle irrigation: If you are considering using these irrigation schedulers for drip irrigation systems, you'll need to convert the application rate from inches (used for overhead irrigation) to gallons (used for drip irrigation systems). Start by determining the area of the field covered by vegetation, as drip irrigation only targets the irrigated vegetation area, not the unvegetated space between rows. Once you have the area you intend to water in square feet, calculate the water requirement in gallons by multiplying the constant 0.544 by the diameter of the plant in square feet and the water use rate in inches. For example, if a tree has a diameter of 6.5 feet and the water use is 1 inch, it will require approximately 23 gallons, assuming 90% system efficiency. For irrigated vegetables, multiply the row width of vegetation by the length of the row, the crop water use in inches, and then by the constant 0.7. To learn more, please refer to the factsheet Drip Irrigation Systems.

In Michigan Irrigation scheduling is required to be in compliance with Generally Accepted Agricultural Management Practices.

All of the above-mentioned irrigation scheduling tools, plus other irrigation management information is available at the MSU Extension Irrigation website.



The MSU Excel Scheduler displays a graph of estimated available water in the root zone, making it easy to track for irrigation scheduling.



Android Apple

MSU Irrigation APP