



Arable Mark 3 in-field monitoring technology

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About the technology

The Arable Mark 3 is a solar-powered in-field sensor that has been commercially available since 2023. The device captures environmental, plant, and soil data with in-field crop and irrigation monitoring. This data provides comprehensive, real-time crop insights to help producers optimize productivity, sustainability, and profitability.

EMILI Objectives

EMILI began collaborating with Arable in 2025 with an aim to:

- test the technology in irrigated prairie potato systems;
- evaluate Arable's in-field crop and irrigation monitoring technology to determine if this would be a useful tool for producers to adopt.

What this technology could unlock

Adoption of Arable Mark 3 could help producers form a precise irrigation plan, optimizing irrigation decisions throughout the growing season. With optimal irrigation output, energy costs and nitrogen leaching could be reduced while still improving overall yield and quality of the crop.

What we learned

EMILI deployed the Arable Mark 3 in an irrigated potato field from the beginning of the 2025 growing season until harvest. During this time, we saw the following:

Trained on the sound of rainfall

Arable Mark 3 captures precipitation data through auditory signals as opposed to a typical rain bucket. The device is trained on the sound of rainfall and eliminates irrigation noises from being collected as precipitation.



The Arable Mark 3 in an irrigated potato field at EMILI's Innovation Farms MacGregor site.

Informed irrigation decisions

As the Arable Mark 3 device is not attached to a pivot system, it cannot automatically alter irrigation output. The data collected enables data-

driven irrigation decisions about when and how much water to apply to maximize crop efficiency and profitability while conserving water.

Crop metrics accessible on app

The Arable App is user-friendly and showcases a variety of weather and plant specific information such as precipitation, crop performance, evapotranspiration, and crop imagery. The producer could view these metrics on Arable's app, and easily export the data as a reference when making agronomic decisions.



“Working with EMILI on Innovation Farms allows us to understand our impact and how user-friendly we are in real time on an actual commercial farm. This project focuses on centre pivot irrigated potatoes, which is an important segment for us.”

Patrick Quigley, Director of Business Development,
Water & Strategic Partnerships, Arable

What we learned



The Arable Mark 3 was installed in a potato field, between irrigation nozzles and above where the nozzles spray.

Optimizing irrigation though field evapotranspiration data

The Arable Mark 3 uses machine learning and daily NDVI measurements to calculate field evapotranspiration and dynamic crop coefficient values. These values are then combined to derive a unique canopy evapotranspiration value to help the producer manage water usage and optimize crop yields. As these values are based on weather conditions around the station and are distinctive to the plants in the field, they provide an evapotranspiration value representative of the conditions in the specific management area.

What is evapotranspiration and why does it matter?

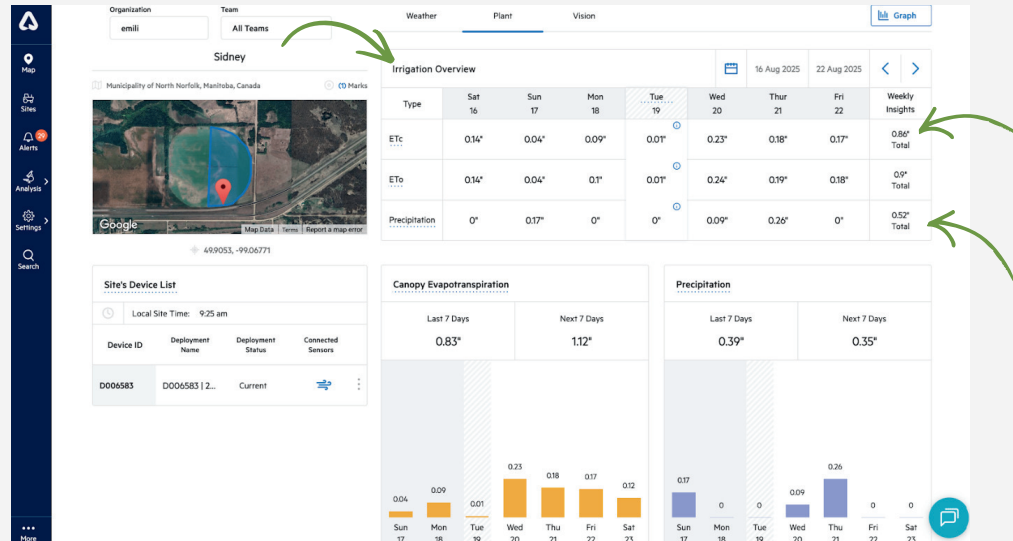
Evapotranspiration and precipitation can be important values for producers to consider while making irrigation decisions. If the precipitation value exceeds the evapotranspiration value, irrigation is not necessary as the input water is more than the amount of water lost. Access to these unique values allows a producer to devise a precise irrigation plan for their fields.

Arable app provides insight into optimal water usage

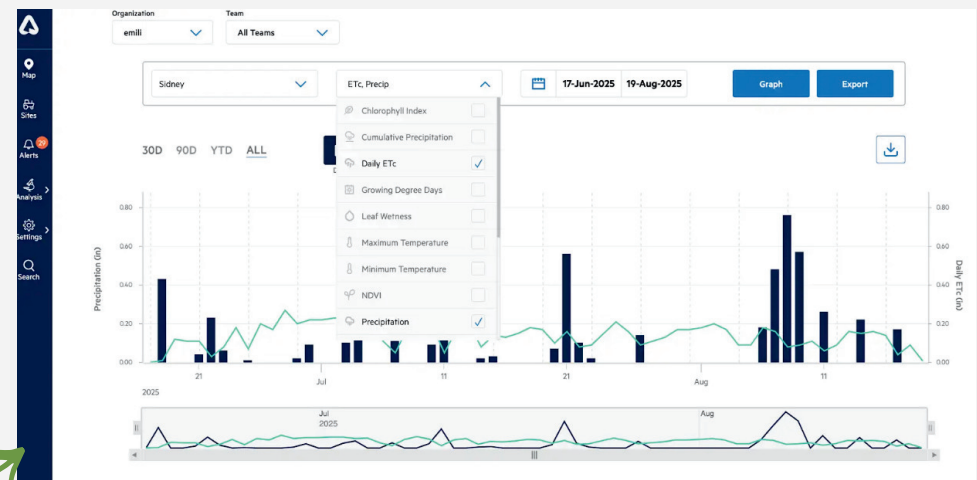
The Arable Mark 3 uniquely combines weather, plant, and soil sensing data with irrigation monitoring and crop images all in one single device. As seen under 'Irrigation Overview', unique ETc and precipitation values are recorded. A producer may interpret these values on a daily, weekly, or monthly basis to determine crop water demand. This could be a valuable tool, although more analysis is required to demonstrate the full value of these metrics on EMILI's Innovation Farm.

A recorded weekly ETc value of 0.86" and precipitation value of 0.52" demonstrates the amount of water lost in the week has exceeded input water. These values indicate the crop requires more water for optimal growth and additional irrigation would be beneficial.

The Arable App showcases a variety of field-specific information, allowing a producer to visualize recorded data and export any desired information as graph, such as the one displayed here.



The above screenshot provides specific plant information in an irrigated potato field.



The above screenshot provides an example of graphed precipitation and daily ETc values.

