

LIQUID PREP

A Decision Support Tool for Irrigation Management



BACKGROUND

Small farmers lack technology and data to design and adjust their irrigation practices in response to weather events and variations in soil, geography, and crop needs. Even large-scale farmers with access to smart technologies often struggle to incorporate the data they collect into their decision-making processes. As a result, farmers in water-stressed areas often face crop or yield losses from insufficient irrigation or waste critical resources by overirrigating. Excessive irrigation can also wash fertilizers and other chemicals from fields and into nearby ponds and streams, often creating environmental problems. As climate change leads to higher temperatures, drought, and more frequent and severe weather events, it will become even more critical for farmers to effectively tailor their irrigation practices to their environments.



OBJECTIVE

To help farmers in water-scarce areas determine the real-time irrigation needs of a given crop to:

- ensure optimum crop yields,
- save water and electricity costs and protect other investments (such as fertilizer and chemical applications, which could be washed away as agricultural runoff) by irrigating only when and where needed, and
- prevent environmental damage from agricultural runoff.

PROJECT

Texas A&M AgriLife Research and the IBM Sustainability Accelerator are in the initial stages of a two-year collaboration to develop Liquid Prep, a decision support tool for irrigation management. The Liquid Prep mobile app will enable farmers to upload actual, hyper-local soil moisture data collected via strategically placed moisture sensors. (Where deployment of sensors is too costly or difficult, soil moisture will be estimated using modeling tools such as Texas A&M's Soil and Water Estimating Tool, or SWAT.) The app will then interact with the Liquid Prep cloud server to access SWAT, external weather APIs, and a crop database. SWAT will calculate the real-time water needs of different areas of a farm or field based on soil moisture, location, soil characteristics, projected weather conditions, and particular crop needs. Irrigation advice will be immediately relayed back to the farmer via the app on their mobile device.

IBM will develop and maintain the app and cloud server and ensure seamless communication between the app, cloud server, sensor hardware, weather APIs and SWAT. Texas A&M will provide IBM with crop data and training in the use of SWAT and will test the core Liquid Prep application and hardware on the field research plots of Blackland Research & Extension Center in Temple, Texas. As much as possible, Texas A&M scientists will document and deliver soil moisture and technical innovation insights to Texas farmers.

IMPACT

The deployment of an irrigation decision support tool like Liquid Prep could enhance the livelihood of farmers around the world, as well as their surrounding communities. IBM possesses immense technical strength to enable digital transformation in agriculture, and the success of this project could spur additional similarly significant future collaborations.