

# Perspective from an ag tech venture capital firm: Seven advancements in irrigation sensor technologies

By Arama Kukutai

Irrigation sensor technologies are hardly new — but the last few years have seen an incredible surge in internet-enabled technologies offering greater analytics, automation, convenience and value, which warrant a fresh look. Over 700 digital ag companies have been founded in this latest wave of innovation, according to ag tech venture capital firm Finistere Ventures LLC and PitchBook data, yet in-ground sensors represent an incredibly small percentage of this group. As farmers increasingly seek out tools to help them influence productivity, sensor technologies that help them understand moisture and other important factors below the soil must play a larger role.

Finistere estimates that only five percent of arable acres across U.S. farms leverage irrigation sensors today, with many farmers pointing to cost constraints, functionality

and ease-of-use challenges as primary barriers. Yet, you cannot manage what you cannot measure. Forward-thinking farmers realize this and are starting to embrace soil sensor innovations.

What is changing? There are seven developments that will drive on-farm deployment of sensors in the years ahead:

1. **Software advancements**, including predictive analytics and learning applications, are enabling farmers to more easily harness “big data” coming from networks of soil sensors and utilize it in practical ways.
2. A push for **stronger integration** with other data sources and internet-connected technology, such as weather and soil salinity tracking tools, has begun to help farmers see the bigger picture.
3. The **surge in connectivity** to the web via low-cost mobile data and short-message service, along with the cost curve of sensor technologies, is driving down costs.
4. **Automation and laborsaving aids** such as smartphone apps that automate irrigation are beginning to emerge, especially for pressurized irrigation systems like sprinkler/pivot and drip/subsurface drip.
5. **Simpler interfaces and dashboards** for smartphones and tablets are making the shift to technology less daunting for farmers trying to make sense of the agronomic decision-making spectrum.
6. Innovations in **self-installation are empowering untrained farm staff** to quickly and easily deploy sensors.



Photo credit: CropX



7. Other technology approaches, particularly **near infrared and multi-spectral imagery**, offer alternatives to in- or on-the-ground solutions. Though they are not silver bullets, they will play an increasingly important role in helping farmers make sense of the soil and other environmental factors.

Making decisions about the most efficient application of water, fertilizer and crop protection chemicals requires information from a variety of sources. This checks-and-balances approach matches application with need and maximizes application uniformity to improve both quality and yield, while minimizing costs and risk. For example, satellite and aerial imaging, as well as ground-based sensors of fertilizer, light, temperature, humidity and precipitation — all combined with “walking the field” — create a holistic view of field activity that enables predictive analysis and intelligent action.

So, where are these advancements coming from? Israel has been a strong source of

sensor innovation — from both historic industry leaders and current players, including a company developing an inexpensive, field-based sensor platform that is user friendly, simple to deploy and complements daily farming practices. New Zealand and Australia have also produced several innovative enterprises that have been incorporated into companies like CropX and Observant (acquired by Jain). The United States, home of the largest farm economy, remains the target for startups such as AquaSpy, Hortau and Phytech.

However, many young companies focus first on high-value crops (grapes, tree nuts and vegetables), then reduce prices as volume increases to penetrate the larger commodity crop market. Yet the high-touch support demanded by high-value crop farmers is difficult to scale without the use of automation and sensor technology. Companies focused on commodity crops, such as Farmer's Business Network, FarmLogs and Taranis, can also benefit from sensor data to enhance existing data modeling technology.

All farmers will increasingly need an integrated range of tools that help them make sense of soil and environmental factors. While there is no substitute for walking the fields, sensors can provide quantifiable data over time to produce more consistent growing results. It is clear we still have much to learn about how the soil works, but the advent of new, less expensive sensors will create farm management practices that can be integrated as part of a broader, intelligent decision support system.

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