DISCLAIMER: Reference to commercial products does not imply that the products endorsed are to the exclusion of other products which may also be suitable. This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold with the understanding that the publisher is not engaged in rendering legal, accounting, or other professional service. If legal advice is required, the services of a competent professional should be sought.

Background

- Drip and Sprinkler irrigation are remarkable water-saving technologies first developed decades ago. Today, that are commonly used all over the world in agriculture, nursery, greenhouse, landscape and a variety of industrial applications.

- The demand for drip/sprinkler irrigation has grown rapidly and still keep growing trend in China due to irrigation water scarcity.

- In recent years, IOT & Sensor Technology has been introduced into the irrigation automation field to make large-scale irrigation systems run much efficiently.

Environment Monitoring System

Irrigation Scheduling Methods

- Weather-based: Schedule irrigation based on the amount of water lost by plant ET and the amount of effective rainfall and irrigation water entering into the plant root zone.

- Soil moisture-based: Measure soil moisture levels in the plant root zone and apply water if there is water shortage for plants.

- Plant-based: Directly detect plant responses to water stress and initialize irrigation as plants indicate suffering from water stress.

Structure of internet based irrigation control system
Environmental Monitoring System

- Installed sensors in multiple locations in vegetable greenhouse, corn, soybean fields

visit [www.cncid.net](http://www.cncid.net)
Access Data Online

Temperature & Sun Radiation in Greenhouse
**Irrigation Automation System**

1. **Radio Mode**
2. **Two-Wire-decoder Mode**

---

**Radio Irrigation System Field Deployment**

1. Based on LoRa network, Radio system run stably, not sensitive for crop canopy shields.
2. Low power design without solar panel, easy installation.

---

**IWHR Radio irrigation System --- for seasonal crop**

**IWHR 2 wire decoder system --- for permanent crop**

- 2Wire irrigation systems rely on uniquely pre-numbered decoders connected along a common 2 wire path, each connected to a solenoid valve.
- The controller feeds typically 24VAC down the path, combined with a digital signal commanding a decoder to turn the solenoid on or off.
- The decoder, whose number matches the signal, obeys the command. All the other decoders ignore the signal.

- Maximally, 762 solenoid valves can be controlled by one controller.
- Maximum wire distance can be extended to 2000m.
Irrigation cloudy Platform

The platform can calculate ET based on environmental monitoring system.

The password-protected web site allows the grower to remotely start/stop the irrigation system, schedule an irrigation/fertigation event, water discharge pressure and temperature high/low tolerances, etc.

Additionally, when the system is running, the grower can monitor the pipe pressure, flow rate, solenoid on/off status, and run hours.
SUMMARY

• IOT & Sensor Technology is capable of automatically measuring and wirelessly transferring soil moisture and weather data online, enabling remote access of the data, and then used for irrigation scheduling.

• A series of successful smart irrigation system based on internet control have proved that the both of the Radio and TW irrigation system performed well.

Summary

• Overall, the grower are very pleased with the systems and see irrigation automation as a critical component of their operation.

• As for the conventional irrigation events during the growing season, water and fertilizer usage were the biggest savings with automated system, and at the same time, the growers were also able to save on labor.
Next step

- Collection of big data in irrigation field is not a
easy job…
- Hope to get more and more irrigation controllers
to exchange data and share data with our
irrigation cloudy platform (www.cncid.net).

Thank You

Yu Yingduo, Ph.D.
National Center for Efficient Irrigation Technology
China Institute of Water Resources and Hydropower
Research (IWHR)

Phone: +86-010-68786533
Mobile: +86-13691485613

Email: yuyd@iwhr.com, 43475538@qq.com
http://www.cncid.net