



Selecting a Monitoring System

Don't leave your plants to chance. How can you choose the right monitoring system for your commercial greenhouse operation?

BY ROB FUSCO

No matter the size of your greenhouse operation, keeping your plants alive and healthy requires the best possible growing environment. This means greenhouse managers and personnel must constantly monitor environmental and equipment status. The sooner someone discovers extreme temperature fluctuations, rising humidity or equipment failure, the more inventory you can save.

Many operators rely on staff to manually monitor greenhouse conditions by walking the facility to physically check heaters, ventilation stacks, humidifiers and the like. However, even at the smallest facilities, this method is inefficient, time consuming and vulnerable to error. Humans can't physically watch every inch of your operation around the clock, but a remote monitoring system is on duty 24/7. Although these devices can't stop an

unforeseen disaster, they can provide immediate notification of problems like frost, frozen or ruptured irrigation lines, heater malfunction and fan failure. If any condition goes outside your preset parameters, the monitoring system instantly alerts you and your staff by phone, email or text.

WHAT YOU NEED TO CONSIDER

In general, environmental monitoring systems work by connecting sensors to a base unit. You select the sensors based on the conditions you want to monitor and set parameters for each, such as minimum and maximum temperature. When the sensors detect readings outside of these limits, your selected recipients are immediately contacted.

To invest in the right monitoring system for your greenhouse operation, it is important to evaluate your specific needs. You'll want to consider the communications access at your site, the types and number of conditions you want to monitor, data logging needs, number of alert recipients and how they are to be notified. You'll also want to evaluate whether hardwired or wireless sensors would work better for your facility.

BASE UNIT AND SENSORS

Because each condition you want to monitor requires its own input on the base unit, you must match your needs with the

Manually monitoring greenhouse conditions can be inefficient and time consuming.

number of inputs available. Lower-cost, non-expandable monitoring systems could meet the needs of smaller sites, whereas larger facilities have many monitoring points and more people to alert when there's a problem. If your operation is poised for growth, purchasing an expandable system could add value to the initial purchase because you wouldn't have to replace the entire system as your operation grows.

An internal rechargeable battery backup is vital to ensure continuous monitoring and alerts in the event of a power outage. It's also a good idea to have each base unit sealed in an enclosure to protect it from moisture, dirt and chemicals commonly found in a greenhouse.

Placement of the sensors is also very important. For example, to ensure thorough coverage, place air temperature sensors throughout the greenhouse. Place temperature sensors next to the thermostat controlling the room temperature and in the center of the greenhouse out of direct sunlight.

WIRELESS OR HARDWIRED SENSORS

If hardwiring sensors would be logistically difficult or cost prohibitive at your location, you can select a system that uses wireless sensors. A hardwired monitoring system connects the sensors to the base device with wires. Often, trenching long distances for wires is time consuming and costly. A wireless system uses sensors with built-in radio transmitters to communicate with the base unit. Some monitoring systems can accommodate a combination of wireless and hardwired sensors.

CELLULAR COMMUNICATIONS

Cellular monitoring devices must be registered on a wireless network before you can send or receive messages and before any local programming is performed for the first time. Because cellular devices perform all communications over wireless network, it is important

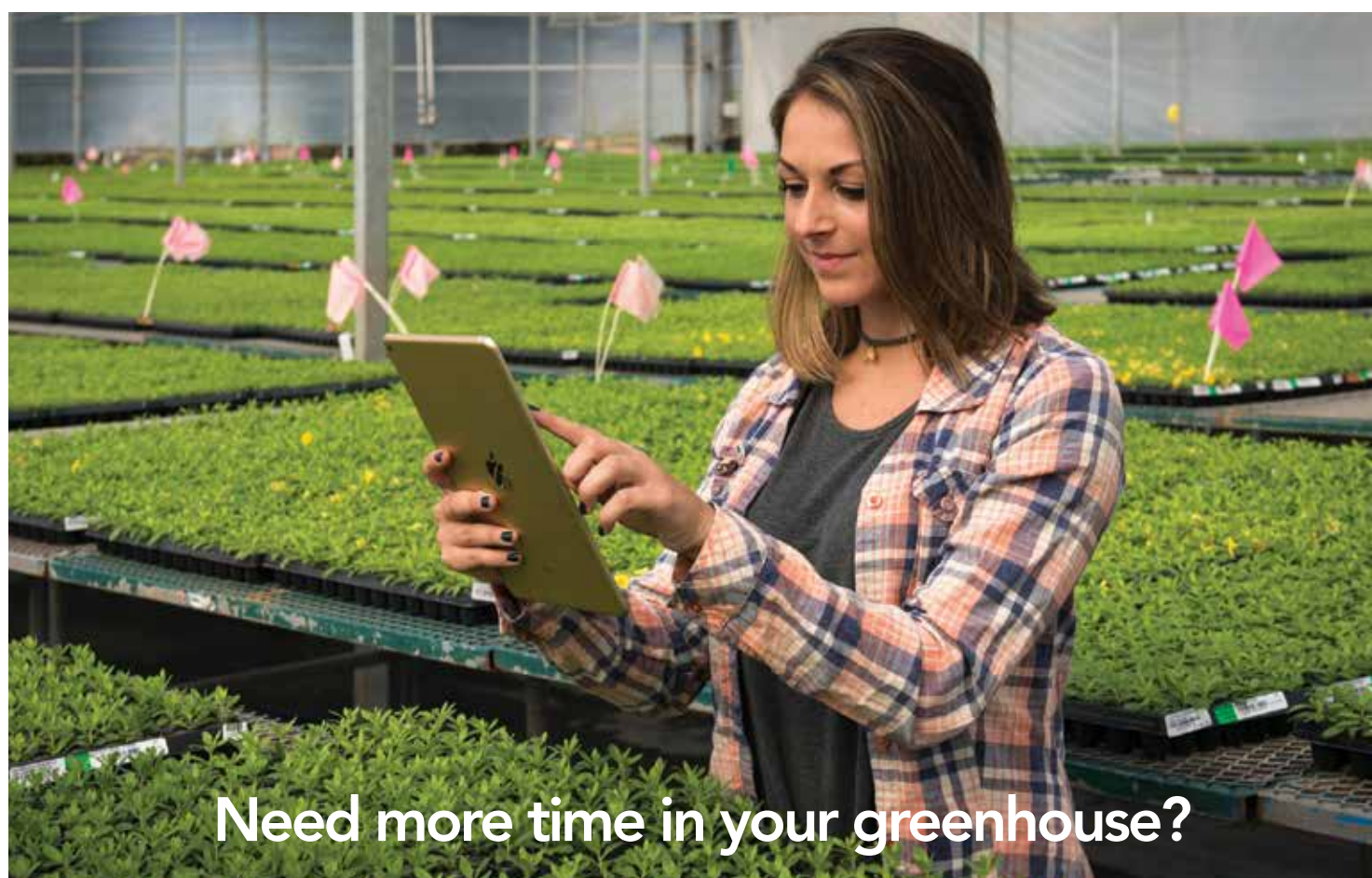
that there be sufficient signal strength at the site. It is a good idea to check the signal quality in the area before purchasing a cellular product. If the cellular network has less than desirable coverage, it is possible to install an

external antenna to help increase the cellular signal.

ALARM NOTIFICATION

When monitoring systems identify a change in status, they immediately send alerts to

everyone on the contact list. It's important to consider the reach of the communications, so that you'll be notified regardless of your location. Multiple communication methods (phone, email and text) provide extra assurance that you'll



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get the alert. Also, note the number of people the system can reach and if the system automatically cycles through the contact list until someone responds. Make sure the system allows for flexible scheduling so it doesn't send alarms to off-duty personnel.

PROGRAMMING AND STATUS CHECKS

If you're responsible for maintaining a commercial greenhouse facility, you want a system that will provide real-time status of all monitored conditions

on demand. Consider how you want to access your sensor readings. Options include calling to check status or viewing a web page, either on a local network or on the cloud. With a cloud-based system, the devices supervise themselves. This means if the Internet or cellular

connection goes down, the device will send an alarm to alert the appropriate personnel. If you don't select a cloud-based system, you will be limited to logging in through a local area network, which will allow you to make programming changes, access status conditions and review data logs. If Internet connectivity is not available at your location, you will want to choose a cellular, phone or Wi-Fi system rather than Ethernet-based option.

DATA LOGGING

Data history is valuable in identifying patterns and trends in environmental conditions. However, manually monitoring and recording environmental parameters takes a significant amount of personnel time and detracts from other important workplace demands. Many monitoring systems automatically save information, recording tens of thousands of data points, dates and times. Cloud-based logging provides an unlimited number of records for users to view, graph, print and export data trends. Analyzing data samples may lend insight to larger issues and prevent problems before they arise. For example, if the data log shows power fluctuations occurring at a regular time, it could be indicative of a more serious problem. Or, if the data shows signs of a ventilation fan beginning to malfunction, it can be repaired or replaced before total failure occurs.

RETURN ON INVESTMENT

When deciding how much you should pay for a remote monitoring system, tally up the entire cost, fully installed with additional peripherals and sensors and any labor fees for installation. Then consider the value of your plant inventory and greenhouse equipment. Finally, factor in the cost of downtime, should an environmental event shut down your operation for a period of time. [gpn](#)

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