



5 Environmental Threats to Greenhouses



Keeping your plants alive and healthy requires the best possible growing environment.

But with so many environmental factors threatening your plants' health and yield, ensuring optimal growing conditions is easier said than done. Temperature fluctuations, humidity levels, power failures...all of these environmental threats and more can damage or destroy your entire plant inventory.

Luckily, there's a way you can continuously monitor environmental conditions across your entire system and protect your valuable plants. Remote monitoring systems immediately alert you to any environmental changes that threaten your plant inventory and property.

These systems prevent disasters and disease during both the growing season and the off-season.

PREVENT DISASTERS & DISEASE

Off-Season

Remote monitoring systems detect problems like extreme temperature fluctuation and frost, frozen irrigation lines, and heater and fan failures 24/7. If any condition goes outside your preset parameters, the system instantly alerts you by phone, email or text. This means you have an extra layer of protection when personnel are not on-site, and you can check conditions from anywhere via the website.

Growing Season

During the growing season, remote monitoring systems monitor temperature, humidity levels, and circulation fan operation...the key factors that prevent mold, algae, mildew and disease and maximize your growing yield.



Threat #1: High/Low Temperatures

Keeping your plants alive and healthy requires the best possible growing environment, so maintaining a controlled temperature is crucial. Temperature affects plant anthesis, and extreme temperature fluctuations negatively impact both plant health and yield. A monitoring system checks temperature 24/7, whether or not personnel are on-site.

You set parameters for each sensor, such as minimum and maximum temperature. When the sensors detect readings outside of these limits, the unit automatically calls, texts or emails the staff members you have selected. It's important to position temperature sensors at each end and in the middle of your greenhouse to allow for fluctuations.

Spring and summer temperature monitoring

High temperatures can severely stress plants, cause leaves to wilt and dramatically affect your crops' ability to produce fruit. In addition, an overheated greenhouse causes the soil to dry out quicker and use more water. By using a monitoring system, users can be alerted to threatening conditions before they become a problem.

Easier greenhouse winterization

Remote monitoring systems help winterize greenhouses properly. Growers no longer need to manually check temperatures throughout the late fall and winter season – a daunting and costly task, especially for larger facilities.

The system monitors temperatures at night when they are lowest. Time is critical when bad things happen like a heater failing or running out of fuel, or a tarp tearing from strong winds. Young plants with a weak root system can die within hours, and mature plants can be damaged. Getting a freeze alert within minutes can save an entire season's crop yield.

MONITORING SYSTEMS ALERT YOU WHEN:

- ① **Temperatures reach unsafe levels**
- ② **Circulation fans or exhaust fans have mechanical issues**
- ③ **Vents fail to open to release heat**



Threat #2: High/Low Humidity

Humidity directly affects plant photosynthesis and transpiration, so controlling humidity is crucial in the greenhouse environment. Depending on the crop, proper humidity levels are typically maintained between 40-85% RH.

Low humidity levels mean the air contains less water vapor, causing plants to lose moisture quicker during the inhalation of carbon dioxide during photosynthesis. During the transpiration process, the pores on a plant's leaves open and take in carbon dioxide. Moisture escapes at a higher rate when the air around the plant is drier. When this occurs faster than the root system can send water to the plant's leaves, the plant shuts down and dries out. Mistifiers, foggers and humidifiers help raise humidity levels.

High humidity levels also negatively impact transpiration. When plants absorb water and minerals from the soil through their roots, transpiration carries these nutrients to the leaves.

Ideal Humidity



FACTORS IMPACTED BY HUMIDITY

Low Humidity

- Poor transpiration
- Dry plants
- Poor photosynthesis



High Humidity

- Poor transpiration
- Poor nutrient absorption
- Poor self-cooling of plants
- Increased mold and fungal growth

If the moisture in the air is too high, the process slows down, preventing the proper absorption of nutrients. Without the release of moisture, plants lose their ability to cool themselves. High humidity also aids the growth of mold and fungal diseases. Ventilation fans, dehumidifiers and greenhouse vents lower humidity levels.

Remote monitoring systems observe humidity levels 24/7. They can also monitor pumps, power, soil moisture content, pressure lines on your misters and controller alarm faults from a single unit.



Threat #3: Power and Equipment Failure

In the event of a power outage, immediate notification can save your plants. Your water well, heater fans, ventilation fans and louvers all require constant electrical power.

Critical greenhouse equipment powered by electricity:

- Water wells
- Heater fans
- Ventilation fans
- Louvers
- Sprinkler/watering systems
- Humidifiers
- Dehumidifiers

“The system gives me peace of mind knowing that we will be informed immediately in the event of a heater failure. Recently, when a heater failed in one of our greenhouses at 6 p.m., the system called our on-site manager. I was able to use a temporary backup system until the heater could be diagnosed and fixed. Those plants would have been exposed all night until the next shift started.”

– Operations Manager for a large NJ-based producer of woody ornamentals

“

Although the wind machines have sensors and auto starts, I need to be alerted before temperatures reach dangerous lows. If I am just a minute too late, it's all over.

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– *Jamie Slingerland,*
Director of Viticulture at Pillitteri Estates Winery



Pillitteri Estates Winery



Threat #4: Ventilation

Greenhouses are designed to trap heat, but too much heat magnified in an enclosed area can quickly destroy plants. Proper ventilation prevents overheating and is critical to maintaining a healthy environment.

Ventilation not only cools a greenhouse, it also provides fresh air, which is needed to produce carbon dioxide. Plants that don't get enough CO₂ are unhealthy and typically have leggy growth. It's all about air exchange.

Most large greenhouse operations have automatic ventilation systems that regulate heat and humidity while providing the proper amount of fresh air. These systems include vented roofs, side vents and forced fans that run on electricity, so it makes sense to place sensors on these units that would send an alert if they stop running or begin operating outside of preset parameters.

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I'm so pleased that we installed a remote monitoring system. I tell my peers in this business that this is a worthwhile investment because it literally pays for itself if it works one time.

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– Mark Holmes,
Operations Manager of Medford Nursery



Threat #5: Security

Remote monitoring systems can perform physical security functions. For example, you can add sensors to entrance doors, windows and doors to individual supply rooms.

To avoid receiving constant alerts on busy days, you can configure the monitoring system to alert you only after hours and on weekends.





Taking Control of Environmental Threats

Remote monitoring systems provide vital protection for your greenhouse. They monitor critical conditions like temperature, leaks, humidity, power failure, equipment failure – even physical security – to provide peace of mind. They offer vital information during the growing season and the off-season.

They also enable you to identify patterns and trends in environmental conditions and get insight into larger issues, allowing you to prevent problems before they arise. They do this by automatically recording tens of thousands of data points, dates and times that you can view, graph, and print.

Whether you are on-site or off-site, you are always aware of the critical conditions that threaten your property and plant inventory.

Remote monitoring systems

- Detect environmental threats
- Instantly inform you of equipment status and failures
- Provide an easy way to check on the status of conditions at any time



Have Questions? Need Advice?

Talk with a Sensaphone greenhouse monitoring expert today at **877-373-2700**, email contact@sensaphone.com or visit www.sensaphone.com/greenhouse.

About Us

Since 1985, Sensaphone® has designed and built its full line of innovative remote environmental monitoring systems and early detection products that quickly and effectively provide alerts to problems at your facilities.

Over 400,000 systems are in use today around the world with the highest customer satisfaction rates in the industry.

Sensaphone is a family-owned business, and products are manufactured in the USA.

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