

A MORE HOMOGENOUS GREENHOUSE CLIMATE WITH SMALL WIRELESS SENSORS

By: [Jos Balendonck, Wageningen UR Greenhouse Horticulture](#)

Faced by major climate variations within their greenhouses, growers regularly use more energy than is desirable to prevent diseases. A measurement network of wireless sensors can help gain insight into climate variations and detect bottlenecks in the greenhouse. This will allow growers to take specific measures that offer more homogenous crops as well as energy savings.

As greenhouses grow in size, growers often notice that the temperature variations increase pro rata. "Variations in temperature, light and CO₂ concentrations have a direct effect on photosynthesis and thus production," according to Marc Vergeldt of GreenQ. He said that a more constant climate will contribute to stronger plants, more homogenous crops, fewer diseases, less labour and a higher yield.

According to some growers, climate variations can result in income losses of between two and five percent. While making the greenhouse climate more homogenous is a solution, it is often difficult to realise in practice. A network of wireless sensors is a practical tool for specific climate improvement.

A dens sensor network

Wageningen UR Greenhouse Horticulture performed measurements with a dense measurement network of 100 sensors per hectare at the facilities of four growers. Scientist

Jos Balendonck explained how they found major variations in temperature (up to 7°C) and relative humidity (RH) (up to 32%) during the night. This results in a significant risk of leaf wetness and cool-wet spots that can manifest as fixed or roaming.

"Wireless systems are currently available that are very suitable for use within the greenhouse," revealed Jouke Miedema of WirelessValue. In these systems, data interpretation takes place via a web-oriented system, and is tailored to a practical interpretation by the grower. This provides a clear overview of extremes in the greenhouse climate, and gives growers an easy insight into the effects of any adaptations they make. A dense sensor network can also provide a clearer insight into the spatial variability of the dew point.

Temporary or permanent

A sensor network can be installed temporarily or permanently. A temporary system is mainly useful for new greenhouses or when a greenhouse is experiencing problems. Rob Wientjens of Climeco Engineering reported that simple and cheap adaptations to the greenhouse can sometimes result in considerable energy savings. A permanent sensor system can also be useful, allowing growers to interactively adapt the set points for the climate computer to realise maximum energy savings and prevent disease.

The management of individual heating units and ventilators directly based on a sensor network remains in the far future. However, positive results are expected soon with a dew point decision support system that calculates the optimal set point and relieves growers of extra work.

[Partners in this HortiSeminar: GreenQ, Wireless Value and Climeco Engineering](#)