

Verification Tests of Multi-Point Measurement Environment Monitoring System in Agricultural Greenhouses **- Reducing the Cost of Controlling Greenhouse Environments -**

Toyota Technical Development Corporation (TTDC, Head Office: Toyota, Aichi, President: Yoshiyuki Kagawa) has developed a compact environmental monitoring system capable of measuring levels of temperature, humidity, CO₂, and the like at multiple points within agricultural greenhouses, and has begun verification tests to confirm its effectiveness.

The purpose of these tests is to study whether the measurement and control technologies that we have developed through our extensive experience in the automotive industry can be applied to other fields, in this case the agricultural sector. Environmental monitoring using this system can identify non-uniform states within a space (i.e., environmental variations) and visualize them in a simple format via the cloud. Through this capability, we envision that greenhouse farmers, plant nurseries, and other users will be able to use this tool to manage levels of temperature, humidity, and CO₂ to reduce costs and help improve growth and productivity.

The photographs below show the system in use in two agricultural greenhouses in Aichi Prefecture. The first photograph shows a greenhouse on a strawberry farm. Because this was a brand new greenhouse, the internal environment differed from other greenhouses on the farm, preventing the farmer from using past knowledge about controlling temperature, humidity, and CO₂. This system is monitoring and visualizing variations in the internal greenhouse environment so that the settings and layout of devices within the greenhouse can be studied in advance for the purpose of preparing a smooth growing environment.

The second photograph shows a greenhouse on a cherry tomato farm. Affected by the rapidly increasing price of fuel, greenhouse farmers are focusing closely on the difficult issue of properly controlling levels of temperature, humidity, and CO₂. This system is monitoring the internal greenhouse environment and verifying that the heating settings and CO₂ levels are not too high. This will allow the farmer to calculate the optimum settings to reduce light, heat, and fuel costs.



Verification test on strawberry farm



Verification test on cherry tomato farm

We intend to analyze the issues and benefits identified through these tests to demonstrate the effectiveness of environmental variation measurement to the agricultural sector.



SDG-related goals:



Overview of Toyota Technical Development Corporation (TTDC)

Established: April 2006

Location: 1-9 Imae, Hanamoto-cho, Toyota, Aichi, 470-0334, Japan

Representative: Yoshiyuki Kagawa, President

Details of business: **IP Business Field**

Searches, technical trend analysis, global filing and rights acquisition (patents, designs, and trademarks), translation, and interpretation.

Keisoku Business Field

Development and manufacturing of measurement instrumentation and equipment, proposals for the planning and design of equipment and facilities, presentation and offering of model-based development solutions, calibration, inspection, and repair of measuring instruments, and support for the development of next-generation businesses.

Capital ratio: 100% investment by Toyota Motor Corporation

URL: <https://www.toyota-td.jp/en/>

