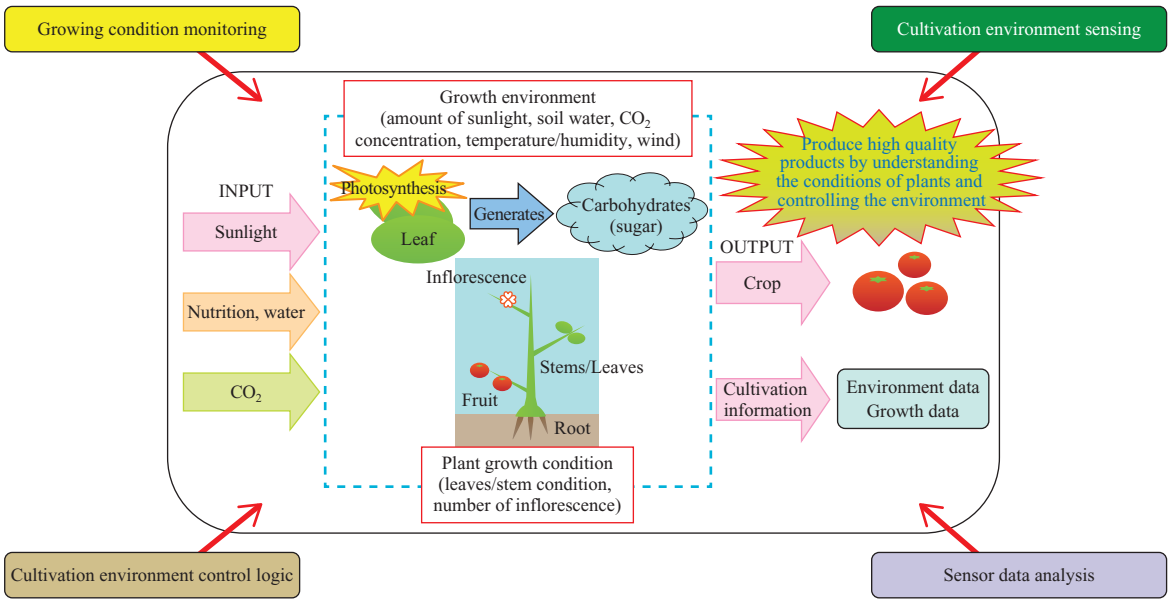
Sweet Tomatoes Produced by Smart Agriculture

"IHI Integrated Environmental Cultivation Control System for Protected Horticulture" that provides safe and secure agricultural products from a vegetable factory using sunlight

The explosion in the population growth of the world has led to reports of a food crisis. On the other hand, the agricultural population in Japan, which was over 15 million after the war, has fallen to about 2 million today, with an average age of over 66. IHI will contribute to solving these issues by using the IHI Integrated Environmental Cultivation Control System for Protected Horticulture to stably produce safe and secure agricultural products.



Cultivation environment control system

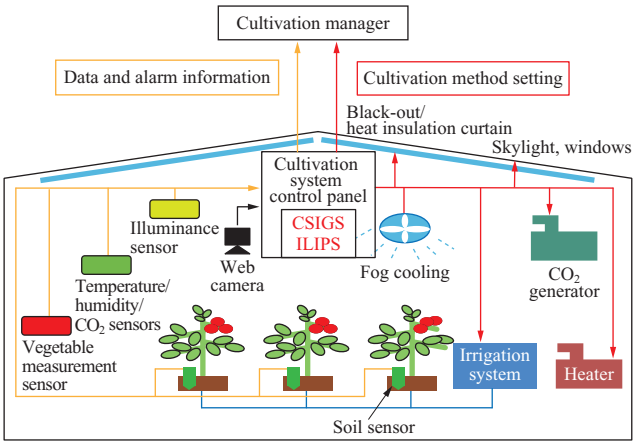
Agricultural situation in Japan

The Japanese agricultural industry is facing problems, such as aging population of workers, lack of successors, falling food self-sufficiency rate, and the threats of TPP (Trans-Pacific Partnership). In addition, due to fears of imported food safety, consumers are increasingly demanding safe and secure agricultural products produced in Japan with less use of agrochemicals.

On the other hand, the export of agricultural, forestry and fishery products marked the highest level yet, exceeding 600 billion yen. In addition, the scale of the food market across the world, which was 340 trillion yen in 2009, is predicted to double and reach 680 trillion in 2020. Because of this, measures and reforms for improving agricultural and farm incomes, promoting business entry into the agricultural industry, supporting new farmers, and advancing large-scale farming through farmland concentration are in progress under the leadership of the government.

IHI Integrated Environmental Cultivation Control System for Protected Horticulture

In order to stably supply safe and secure agricultural products, IHI STAR Machinery Corporation (IHI STAR) and IHI are committed to the development of a vegetable factory using sunlight (greenhouse cultivation) that can cover a diverse range of agricultural products. The core of the vegetable factory is the IHI Integrated Environmental Cultivation Control System for Protected Horticulture (hereinafter I-IECS). The system is built upon the following technologies: ① IHI Group's ICT



I-IECS

Image of cultivation for demonstration

(Information and Communications Technology), ② sensing technology, ③ Factory Automation (FA) technology, and ④ system control technology. These technologies enable the stable supply of safe and secure agricultural products using a minimum amount of agrochemicals. This system's large control section is composed of sensors, including the soil water sensor, CO_2 sensor, and temperature sensors, and CSIGS (Control System of IHI group: Global Series C-type), a controller developed by IHI that controls air-conditioners, windows, curtains, irrigation systems, and other environmental equipment. In addition, the measurements of the greenhouse environment can be checked via email or the Internet by the customer using the remote monitoring function of ILIPS (IHI group Lifecycle Partner System).

The I-IECS uses IHI STAR's knowledge on agriculture (agricultural machinery and cultivation knowledge), including ① knowledge on the correlation between the amount of irrigation water and sugar content/yield obtained through the analysis of data from ILIPS, ② the operation of environmental equipment for greenhouses throughout the year, and ③ adjustment of the amount of irrigation water and environment equipment to achieve sophisticated control reflecting seasonal and climatic conditions. As a result, the farmer can, for instance, control the environment so that it will not be too humid, which leads crop diseases, and thereby avoid using excessive crop dusting. With this system, IHI aims to achieve stable and quality harvesting by automating some of the adjustment tasks for which skilled workers had to be relied on. This system also paves the way for a cultivation support business providing analyses of accumulated cultivation data.

As explained above, this is a unique system that only the IHI Group that has both agricultural knowledge and advanced control technologies can offer.

High sugar content tomatoes

We selected tomatoes, high sugar content tomatoes (high added value tomatoes) in particular, which are traded at high prices, as the crops to be cultivated using the IHI Integrated Environmental Cultivation Control System for Protected Horticulture from the following perspectives:

① Tomatoes are the most widely yielded produce in Japan and there are many facilities for cultivation, which allows us to expect the system to be introduced in a wide range of facilities.

② The size of the market is large and price erosion is unlikely even if high added value tomatoes are supplied to the market.

③ The selling price per unit area is high, which makes tomatoes more attractive to invest in.

④ Introduction of this system will make it easy to create added value, which allows us to expect more agricultural producers to handle tomatoes with high sugar content.

⑤ Tomatoes are a global food and demand for processed tomatoes is also high, which allows us to expect production and sales overseas.

Demonstration cultivation and sales in Hokkaido

IHI STAR, IHI, and a company engaging in the greenhouse cultivation business (farmer) in Hokkaido are jointly cultivating and selling high sugar content tomatoes using this system.

The high sugar content tomatoes cultivated in cooperation between the three companies have been well received. There have even been inquiries from department stores in the Tokyo Metropolitan area, these tomatoes are being traded at high prices, and production cannot keep up with the demand.

Although the cultivation area is only about 0.5 ha, they started to expand the area in FY 2015 and plan to produce and sell the tomatoes in a concentrated area of at least 1 ha in FY 2016.

Business development with overseas deployment in mind

In light of the results in Japan, IHI will launch the system in overseas markets where demand for high sugar content tomatoes can be expected. By expanding into China, Russia, and other Asian countries that have climates similar to that of Hokkaido where IHI STAR has a track record of selling its products, IHI will contribute to solving the food issue not only in Japan, but also in other countries around the world.

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