Greenhouse Automatic Control System

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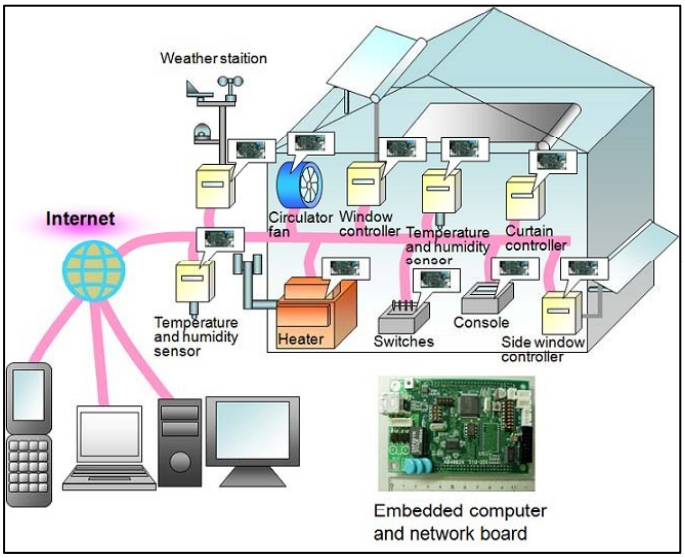
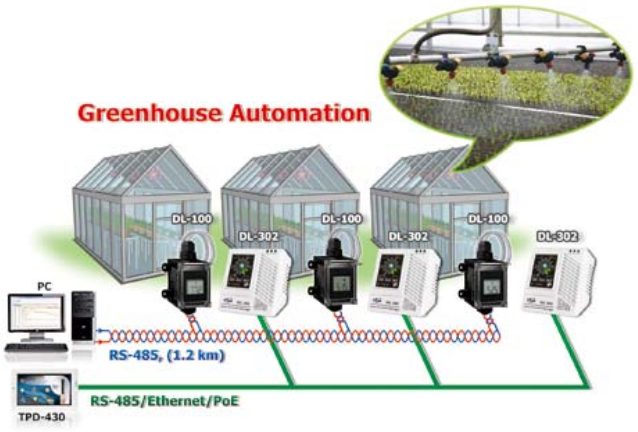
Introduction of Microclimate Control in Greenhouses

Monitoring and control of greenhouse environment play an important role in greenhouse production and management. Greenhouse monitoring and controlling project is used to measure the various parameters like Temperature, Humidity and Light and to display them on a LCD. Temperature, Humidity and light are sensed by respective sensors.





- The main reason for microclimate control in greenhouses is to achieve maximum plant growth and yield. Automatic control system monitors: inside the greenhouse (soil and air temperature, relative humidity, carbon dioxide concentrations, electrical conductivity and soil moisture) outside the greenhouse (temperature, relative humidity, solar radiation, wind speed, wind direction and rainfall rate) equipment (pipe temperature, vents and curtains position)

CLIMATE IN THE GREENHOUSE IS CONTROLLED BY:

- **HEATING SYSTEM**
- **VENTILATION AND FOGGING SYSTEM**
- **LIGHTING AND SHADING SYSTEM**
- **FERTIGATION IRRIGATION SYSTEM**
- **CO2 INJECTION SYSTEM**

HEATING SYSTEM

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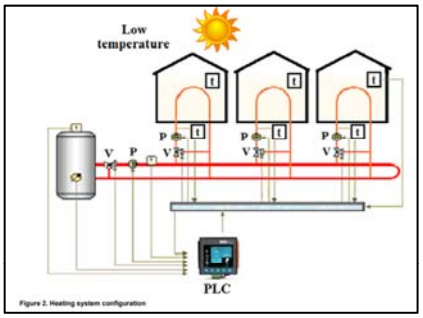
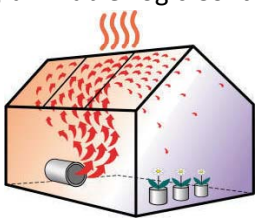
DME Burner

Controlled by automatic system

General source of Heating



Programmable Logic Controller



VENTILATION AND FOGGING SYSTEM

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Side windows for ventilation

Controlled by automatic system

General source

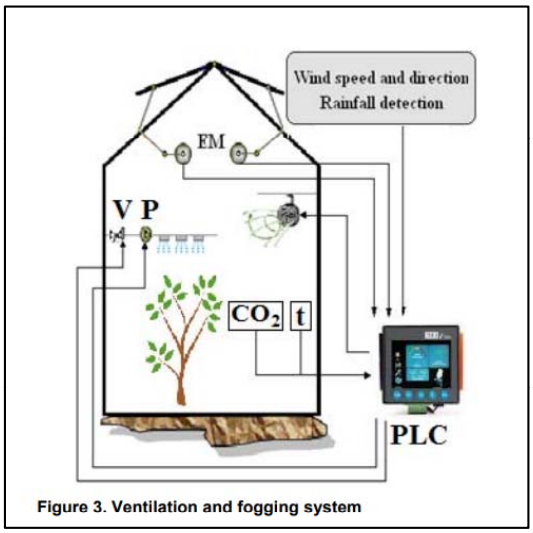

Figure 3. Ventilation and fogging system

SHADING SYSTEM FROM SOLAR RADIATIONS

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White curtains

Controlled by automatic system

General source

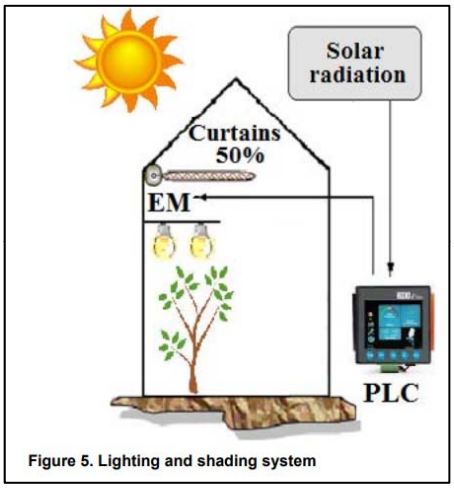

Figure 5. Lighting and shading system

IRRIGATION SYSTEM

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Water nozzles spray

Controlled by automatic system

General source

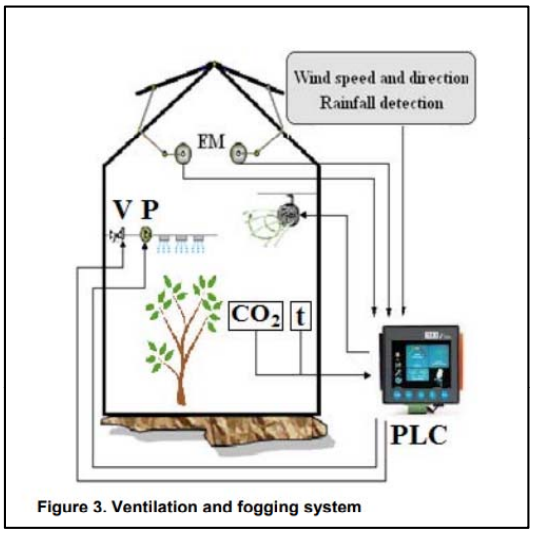

Figure 3. Ventilation and fogging system

CO_2 INJECTION SYSTEM

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DME Burner

Controlled by automatic system

General source

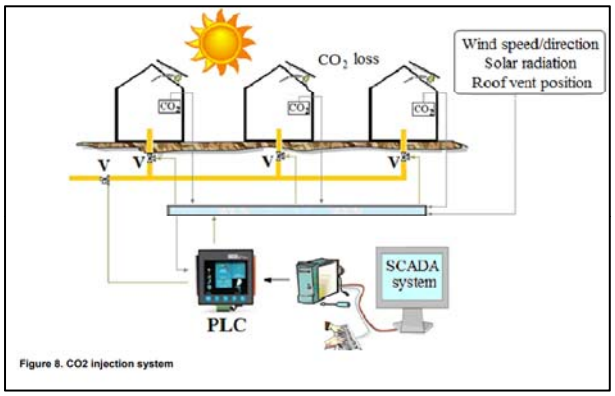
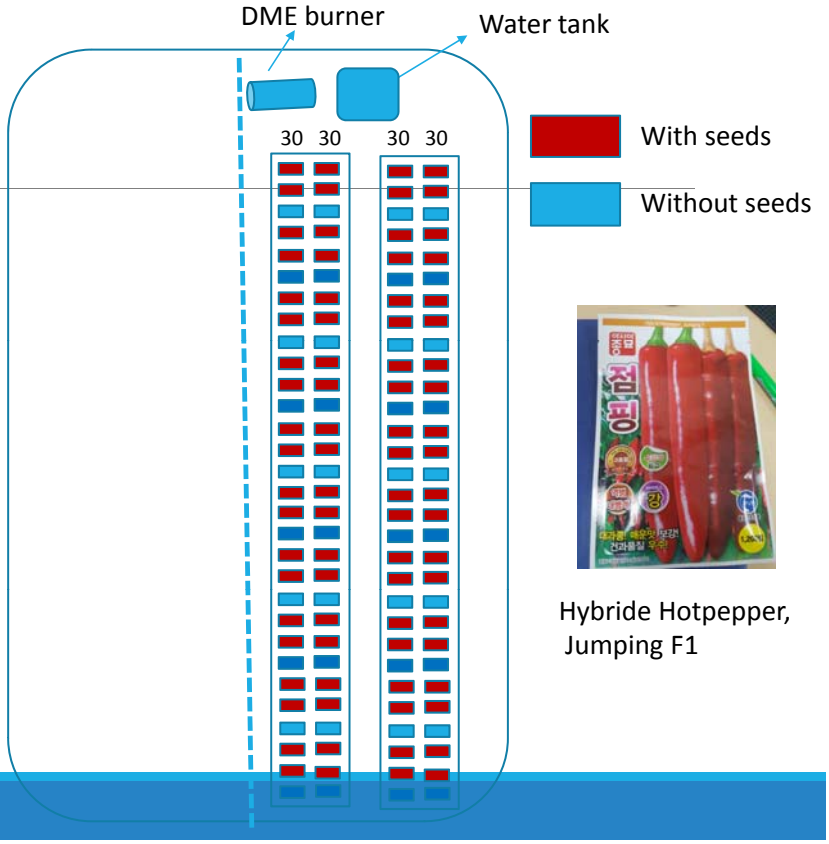
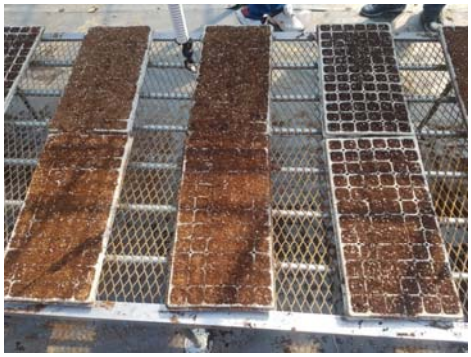


Figure 8. CO2 injection system

Our experiment objective was to Estimate the Strength of Biodegradable Organic Pots in the Process of Growing Plants in Control Greenhouse



Seedling in Greenhouse



Hybride Hotpepper, Jumping F1

Automatic system of Greenhouse

www.farmsys.kr

2 sensors

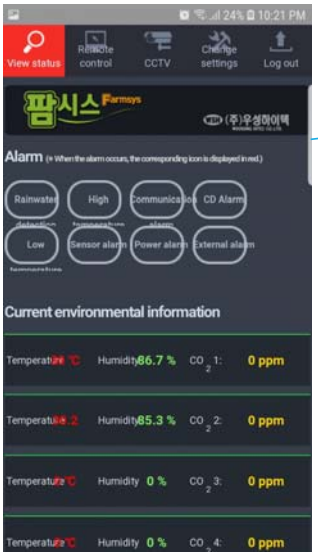
Temperature and humidity sensor

5 channels setting

1. **Top outside window (Temp 20-24C)**
2. **Top inside window (Temp 26-30C)**
3. **Top white cover (Time: 6:30pm-6am)**
4. **Side outside window (Temp 20-24C)**
5. **Side white cover (Temp 26-30C)**

Water spray setting : Daily 10 min (10am-10:10am)

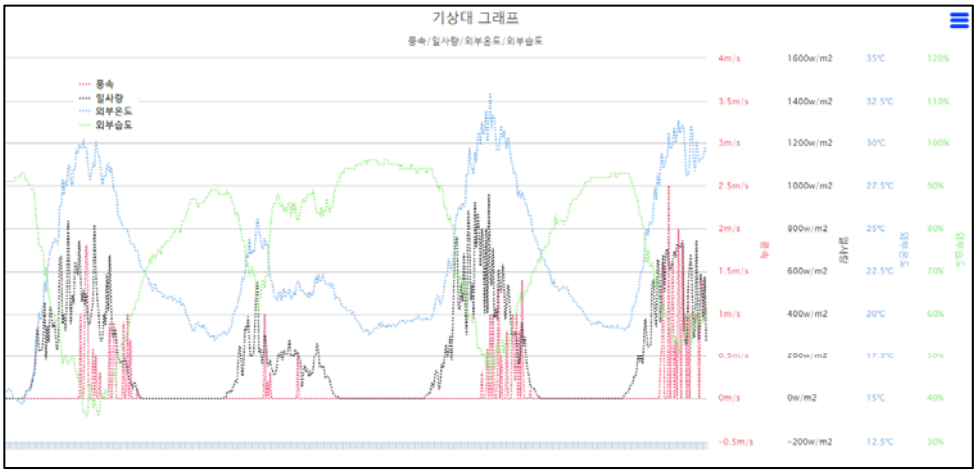
Data Recording and control system by using online software



Control greenhouse by using mobile phones and PC

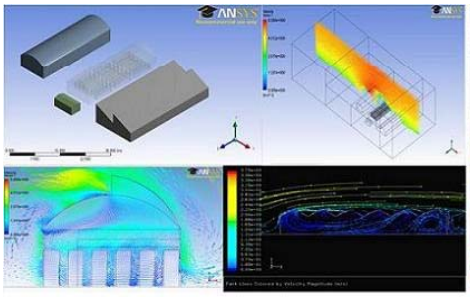
Outside Weather station

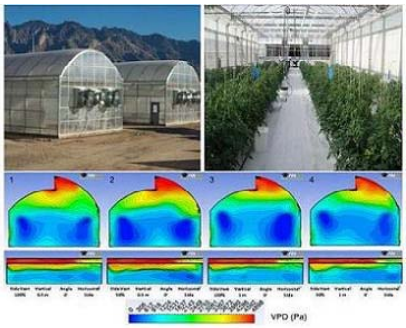
Wind speed, Solar radiation, temperature, Humidity

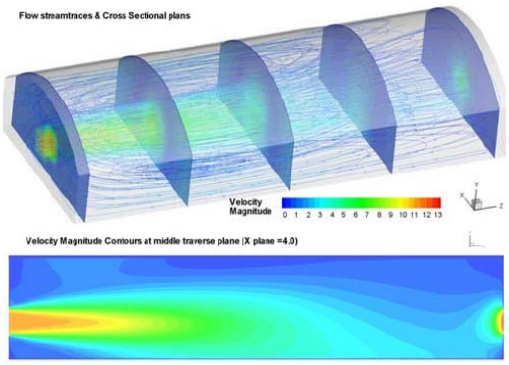


FUTURE EXPERIMENT

Air Flow and Temperature Distribution inside Greenhouse Facility by using Computational Fluid Dynamics (CFD)







Thank you