LIFE 09 ENV/GR/000296 adapt2change Newsletter
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adapt2change

Adapt agricultural production to climate change and limited water supply

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Steering Committee Meeting at Larisa (04 October 2012)

During the 4th October 2012, the project partners organized a meeting at Larisa premises with the participation of Dr. A. Koutsolioutsou, representative from Life+ Monitoring Team. The meeting included, presentations, conversations, audits and a tour at the prototype greenhouses. During the day, a test of the prototype greenhouses was organized in order to demonstrate their potential towards the operation of the water recycling and environmental control system. During the meeting, numerous decisions were taken in order to alleviate the delays and to boost the project implementation by starting the first cultivation period in April 2013.

Picture 1. The prototype Greenhouses at Larisa.

Contents:

Water Recycling Unit—First results

During October 2012, the prototype greenhouses at Zygi, Cyprus were tested, in order to verify the water recycling unit's performance. The system's technical performance was successful and the first results of the system's operation were extracted, by producing water from the dehumidification of the air. The picture below, illustrates an indicative amount of produced water that can be recycled and reused inside the closed prototype greenhouses.

Picture 2. Prototype Greenhouses at Zygi—Water recycling subsystem testing.

The significance of CO_2 enrichment-application inside the Greenhouses

Historically, the importance of carbon dioxide as the basic material for photosynthesis, has been widely known and accepted. The link between knowing and applying was quickly realized by growers in Europe who perceived the commercial advantages of CO_2 application inside the greenhouses. CO_2 enrichment was at first accepted as commercial practice following very little research effort. In fact, research has not kept pace with commercial development. While a great deal of data is available on photosynthesis covering many varieties of plants, the part played by CO_2 is perhaps the least understood. The concentration required for maximum photosynthesis depends upon the levels of many factors, such as light, temperature, humidity and water and nutrient supply. Some basic research to study the interaction of these factors has been carried out but the picture is far from complete. Most research is now directed to field application to find the most economical levels of applying CO_2 to obtain maximum yields under the different growing conditions. Crops are sensitive to sulphur dioxide and incomplete combustion products. Therefore, fuel quality and complete combustion is very important.

For more information click here:

Greenhouse Automation

Automation System

The automation system will be based on a central control unit that will communicate with peripheral sub-systems (hydroponic, geothermal, water recycling, climate) in a robust communication protocol. This SCADA like system will have the following advantages:

• Distributed control with greater flexibility, ease of maintenance, installation cost savings, etc

• User friendly graphical interface for operation by non experienced personnel and for educational or promotional purposes.

• Web server operation for remote monitoring, maintenance, etc.

• Scalability and implementation of various scenarios for research purposes.

The central control unit consists of the following:

• An industrial SCADA server with robust characteristics in order to operate under severe climate conditions. The unit will be hosted in a chassis with very good temperature and humidity characteristics and will provide ease of maintenance.

• A touch-screen display monitor having a robust design with anti-rust chassis, aluminum die-cast and sealed front panel.

Automation sub-systems

The sub-systems will be the following:

• Automation sub-system for natural cooling and cooling panels. It will consist of all the necessary electrical components for window opening or closing procedures, as sensors (for temperature, wind, rain monitoring), motors and local control unit.

• Automation sub-system for greenhouse curtains control, as motors with reduction gear.

• Automation sub-system for greenhouse hydroponics. It will consist of a hydroponic head that will measure all hydroponic quantities and will communicate with central control unit.

• Automation sub-system for greenhouse fans. The system will control the fans and the underground water pump that will make wet the cooling panel. It will also contain a water tank for storing water.

• Automation sub-system for the control of temperature pump condenser.

• Automation sub-system for air recycling and humidity collection. It will contain servo motors with position control, valves, airflow sensor and speed control inverter.

• Temperature and humidity sensors for the climate control.

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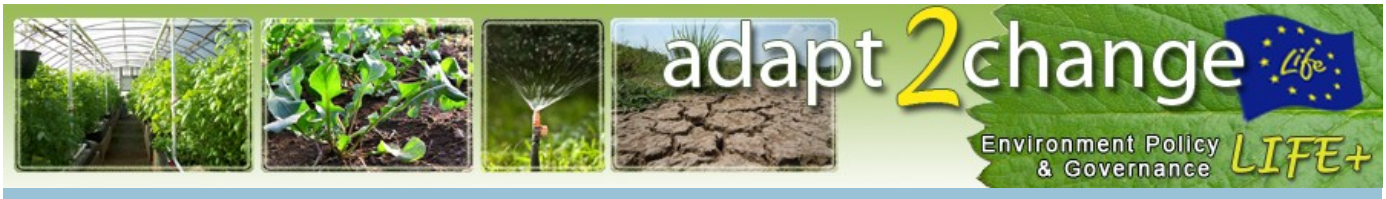

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