

New polyhouse technology to help cultivate off-season crops

New Delhi, Aug 05 (India Science Wire): A polyhouse is a specially constructed structure like a building where specialized polythene sheet is used as a covering material under which the crops can be grown in partially or fully controlled climatic conditions. It is covered with a transparent material as to permit the entry of natural light. Polyhouses are also helpful in reducing threats such as extreme heat and pest attacks in crops.

Professor (Dr.) Harish Hirani, Director, CSIR- CMERI, Durgapur recently inaugurated a “naturally ventilated polyhouse facility” and laid the foundation stone of “retractable roof polyhouse” at CSIR-Central Mechanical Engineering Research Institute (CMERI)’s regional centre based in Ludhiana. Briefing about the technology, Prof. Hirani said that with rapidly rising temperatures due to mounting greenhouse gases in the atmosphere from human activities, crops are increasingly facing both threats - extreme heat and pest attacks - simultaneously.

This is especially important for crops growing in the open field with no protection from the weather, and therefore its yield, quality, and crop maturity timings are changed. A combination of open field conditions and conventional greenhouse conditions is a more robust way to deal with climate change and associated problems in the future. Crop losses in India due to insect pests is about 15% at present and this loss may increase as climate change lowers the plant defense system against insects & pests.

Conventional greenhouses have a stationary roof to reduce the effect of weather anomalies and pests. However, there are still disadvantages due to roof covering which sometimes lead to excessive heat and insufficient light (early morning). Besides this, they are also prone to insufficient levels of CO₂, transpiration and water stress.

“Retractable Roof Polyhouse Technology will have an automatic retractable roof which will be operated based on weather conditions and crop requirements from the conditional database using PLC software. This ongoing development will be useful in our country with its 15 different agro-climatic zones and will help farmers to cultivate off-season crops that can fetch higher value and income”, says Dr Hirani.

Mr. Jagdish Manikrao, Senior Scientist, who is leading the research team on the development of this technology, explained that the retractable roof will be used to manipulate sunlight quantity, quality & duration, water stress, humidity, carbon-di-oxide levels, and crop & soil temperatures. Dr. Pradeep Rajan, Sr. Principal Scientist, Head, Farm Machinery and Precision Agriculture further elaborated that this structure is being developed in collaboration with CSIR-IHBT, Palampur and is in the process of integrating Artificial Intelligence in automating the Polyhouse based on the crop and weather requirements and providing an IoT enabled farmer friendly user interface.

The Director, also briefed that as the scientific experimental data on the advantages of the new polyhouse system are lacking, therefore horticultural crops will be cultivated in both naturally ventilated polyhouse and retractable roof polyhouse for comparing the crop production and produce quality. With installation of naturally ventilated polyhouse and retractable roof polyhouse side by side, we can get the required scientific data and by analyzing the results we can enhance productivity. The developed facility will be used as a demonstration farm for the farmers. (India Science Wire)

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