

Project Summary

USDA-NIFA Conference

Interdisciplinary Controlled Environment Indoor Agriculture R&D Roadmap and Coordinated Research Plan

The University of Arizona, Biosphere 2

September 9 – 12, 2019

Summary

The controlled environment agriculture food production industry, that includes greenhouse and other indoor crop production systems, is expanding, seemingly without bounds in the US. There is a confusing amount of information, with insufficient R&D support, a lack of education of growers and a general void of experience about the industry and its technologies. This program will create a conference (AzCEAC) that will bring together the major US academicians, researchers, industry partners and business developers with a focus on food crops production and its intricacies and inter-disciplinary components that exist within controlled environments. From this conference there will result academicians with better understanding of the production process and its challenges; stakeholders with better appreciation for the complex nature of CEA, and decision-makers more informed about CEA. A document outlining the strategy for the future development of the US industry will be created. ***This document will help guide a coordinated R&D supporting effort, nationwide, that will lead to effective development and implementation of the future of the CEA food production industry.***

Goals / Objectives

The promise of CEA indoor and vertical food production is technology intensive, requires large capital investment and energy inputs, and demands higher level worker skill and knowledge for effective operation. Although controlled environment agriculture systems can manage light, water, temperature, nutrient elements and CO₂, these conditions, especially with new cultivars, different species and innovative production systems now in development, have not been optimized. Furthermore, there are unknowns about business economics, long-term sustainability, and consumer trends, adding more challenges to overcome within the complex CEA production systems. Therefore, an integrated, cross-disciplinary, systems-based approach is required that combines stakeholder needs with feedback to address challenges and to identify opportunities to grow this industry sustainably and contribute to the U.S. agricultural economy. A coordinated strategic plan for CEA indoor crop production R&D is needed for the U.S. ***We propose to begin to address this strategic plan with a conference (AzCEAC) that brings together industry stakeholders, experts, and researchers from across the U.S. to engage in cross-cutting and interdisciplinary discussions of the R&D challenges, opportunities, and needs involved in developing Controlled Environment Agriculture (CEA) indoor and vertical production of vegetable crops as a viable and sustainable industry in the U.S.***

Methods

The primary effort will be in the establishment of a conference (AzCEAC) that will bring together the major players in the controlled environment production agriculture education, research and industry space. ***They will meet in facilitated and coordinated discussions sessions to enhance information and knowledge sharing among the entire conference attendees.*** The attendees will also meet in focused topic discussion groups with representatives of various backgrounds to develop interdisciplinary knowledge of the challenges of CEA. A visit to several CEA production facilities will initiate the conference, allowing for introductions among participants, and opportunity to view successful CEA production facilities.

Target Audience

The target audience of the AzCEAC Conference is CEA industry stakeholders, consultants, policy-makers, educators and researchers from across the U.S. to engage in cross-cutting and interdisciplinary discussions of the R&D challenges, opportunities, and needs involved in developing Controlled Environment Agriculture (CEA) indoor and vertical production of vegetable crops as a viable and sustainable industry in the U.S. ***The ultimate audience will be the stakeholders including the growers, producers, managers, supply-chain, manufacturers, sales and service personnel who contribute to the food production requirements and activities within CEA.***

Products

There will be two major 'products' from the AzCEAC conference: 1) Conference organizers will synthesize outcomes from presentations and discussions to publish a preliminary workshop report within 30 days followed by a research roadmap for CEA Indoor food production agriculture in the U.S., within 90 days. The report will be an integrated, cross-disciplinary, systems-based approach that integrates stakeholder needs and feedback to address challenges and to identify opportunities to grow the CEA Indoor food production industry sustainably and expand the U.S. agricultural economy. 2) Conference organizers in collaboration with conference participants, as well as others with interest, but unable to attend, will develop a proposal for a coordinated agricultural project (CAP) grant on CEA Indoor food production that addresses elements within the major thematic areas determined at the conference. The outcome of this research will lead to forming cross-disciplinary teams with diverse stakeholder participation to develop coordinated projects for submissions to USDA-NIFA SAS, SCRI, NSF/USDA/DOE INFEWs, and other funding programs.

Expected Outcomes

A change in Knowledge and in Action from the AzCEAC conference will include academicians with better understanding of the controlled environment production process and its challenges; stakeholders with better appreciation for the complex nature of CEA, and decision-makers more informed about CEA. ***A document outlining the strategy for the future research and educational needs of the US industry will be created.*** This will help guide a coordinated R&D supporting effort, nationwide, that will lead to effective development and implementation of the future of the CEA food production industry.