



ASIAN PRODUCTIVITY ORGANIZATION

## PROJECT IMPLEMENTATION PLAN

24 February 2016

1. **Project Code** 15-AG-23-GE-TRC-A-02
2. **Project Title** Self-learning e-Course on Controlled-environment Agriculture
3. **Reference** Project Notification 15-AG-23-GE-TRC-A dated 24 April 2015
4. **Timing** 1 December 2016–30 April 2017 (five months)
5. **Implementing Organization(s)** APO Secretariat and National Productivity Organizations (NPOs)
6. **Number of Participants** Minimum of 400 participants
7. **Self-registration** Self-registration opens from 10:00 AM Japan Standard Time on 1 December 2016 on the APO's e-learning web portal: <http://www.apo-elearning.org/Moodle--/>.

Note: Participants can register directly from this portal on the APO website. Those who are already registered can access the course by using the assigned username and password. If you have forgotten your username and password, please refer to the FAQs on the home page of the portal.

### 8. Objectives

To provide basic knowledge of the concepts and principles of controlled-environment agriculture (CEA), as well as the basic skills, tools, techniques, and technologies of CEA production systems.

### 9. Background

The challenges of limited land available for food production, growing scarcity of irrigation water supply, precarious weather and changing climatic patterns, and a need to restrict chemical use are paving the way for more CEA production systems to produce a safe, abundant food supply in an efficient, sustainable manner. With such systems, producers are able to manipulate the crop environment to the desired conditions using precise technologies and equipment to improve the

efficiency of operations as well as the consistency of products. This has already started with simple CEA systems, but the more advanced systems now available offer greater power and precision.

The most advanced CEA systems have the advantage of high levels of certainty in meeting contractual commitments for the delivery of produce because cropping intensity and production cycles are programmed to meet market requirements in terms of volume, timeliness, and quality. Production is tailored to consumer specifications from the very beginning. Such production systems also reduce the risks of diseases and pest infestations and the corollary labor required to address such problems in conventional agriculture. They also address the aging of farmers, which has resulted in a scarcity of farm labor. With such CEA production systems, artificial intelligence is taking over many of the tedious tasks formerly performed by farm workers.

The more popular CEA systems like greenhouses and hydroponics-based technologies have been widely adopted in many advanced countries in Europe, North America, and Asia, notably Japan, the Republic of Korea, and the Republic of China, to produce various horticultural crops. Some investments in such systems have also been made in periurban areas in Malaysia, Thailand, and the Philippines. The systems are seen as having great potential for agribusiness investment and for increasing agricultural productivity and food production, even with declining areas of prime agricultural land and obvious impact of climate change on agriculture.

## 10. Scope and Methodology

### Scope

The tentative course structure is:

Module 1: Introduction to CEA (e.g., definition and key concepts; socioeconomic and environmental importance; global trends; types of CEA; and issues, challenges, and opportunities)

Module 2: Growing systems and the crops they support

Module 3: Crop maintenance (e.g., crop layout, plant lighting, pollination)

**Quiz 1** (for self-assessment based on questions from Modules 1, 2, and 3)

Module 4: Irrigation systems

Module 5: Plant nutrition

Module 6: Insect pests and diseases and their management

**Quiz 2** (for self-assessment based on questions from Modules 4, 5, and 6)

Module 7: Greenhouse structure and design (including different types of environmental control systems, their construction, and maintenance and operational costs)

Module 8: Environmental control and energy conservation

Module 9: Food quality and safety (e.g., GAP, GHP)

Module 10: Marketing of CEA produce

**Quiz 3** (for self-assessment based on questions from Modules 7, 8, 9, and 10)

**Final Examination**

## **Methodology**

Self-learning e-modules, additional study materials for participants, intermittent quizzes for self-assessment, and a final examination to qualify for the APO e-certificate.

### **11. Qualifications of Candidates**

The target participants include government officers, agricultural extension service providers, producers, entrepreneurs, academics, consultants, and other technical personnel with particular interest in CEA.

### **12. Eligibility for e-Certificate**

A minimum score of 70% on the final examination is required to qualify for the APO e-certificate.

Participants from nonmember countries are welcome to take the course for self-development, although APO e-certificates will not be provided.



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Secretary-General