PROJECT IMPLMENTATION PLAN

27 September 2018

1.	**Project Code**	18-AG-23-GE-DLN-A-03
2.	**Title**	Self-learning e-Course on Building Climate Change-resilient Agriculture
3.	**Reference**	Project Notification 18-AG-23-GE-DLN-A dated 9 January 2018
4.	**Time and Duration**	17 December 2018–16 June 2019 (six months)
5.	**Implementing Organizations**	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 17 December 2018 on the eAPO's web portal: http://eAPO-tokyo.org 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 help page on the home page of the portal.

8. Objectives

The course is designed to study challenges in agriculture that climate change will bring. It will discuss applicable adaptation methods to increase agroclimatic resilience for policymakers, professionals, SME operators, and practitioners of agricultural and food production. At the end of the course, participants will be able to:

a. Identify future scenarios of agroclimatic change and discuss strategic options to deal with short-/long-term impacts to increase the productivity and competitiveness of agricultural operations;
b. Promote recent technological developments and innovations in climate-resilient agriculture and their applications in agricultural management systems and food production; and
c. Share successful case studies on incorporating effective resilience-enhancement models to mitigate the risks of extreme weather change and enhance the sustainability of agriculture.

9. Background

According to the definition of the US National Aeronautics and Space Administration (NASA), climate change refers to a change in earth's climate or the usual weather patterns such as temperature, precipitation, and snowfall. For the past decades, meteorological numerical data have shown that the amount of carbon dioxide (CO_2) in the atmosphere increased at higher rates than at any other time in history. In 2013, CO_2 levels exceeded 400 ppm since the figure exponentially arose from 300 ppm in 1950. Over the next 30–50 years, the earth's average temperature is estimated to increase by 1.0°C and will continue to rise for the next 100 years, which will lead to melting glaciers and rising sea levels.

Agriculture is inextricably linked with climate change. The changing hydrologic cycle causes irregular events of droughts and floods in agricultural regions. Arable land zones are also susceptible to unexpected temperature change, and the distribution of crop diversity and productivity will be severely affected. For example, the average yields for corn, rice, and potatoes are forecast to decrease by 24%, 11%, and 9%, respectively, by 2050 compared with their yields in 2000. The literature points out that a warmer world will lead to the spread of crop pathogens, expansion of insect pests, unpredictable crop yields, food price fluctuations, agricultural market instability, and food insecurity. The importance of building food production systems and agricultural ecosystems resilient to the changing climatic conditions is obvious.

Developing possible climate scenarios and preparing adaptation strategies are critical in managing climate risks. Emergency guidelines and manuals for extreme weather events and technical solutions to forecast weather are urgently required to respond to the various options in the likely scenarios. New crop breeding techniques for increased temperature and drought resistance are also called for to ensure sustainable productivity. Advanced technologies for data collection and field testing as well as agricultural infrastructure such as efficient irrigation techniques are another way to adapt to capricious agroclimatic conditions.

This e-course will share smart innovative approaches and recent technological solutions to respond to climate change and enhance agricultural productivity. It will also promote climate change adaptations as usual practices in agricultural production systems for scaling up in APO member countries.

10. Scope and Methodology

Scope

The tentative course structure is as follows:

Module 1: Climate change and impact on agricultural productivity and food production

Understanding climate change and its impacts; key drivers of increased global awareness of climate change; case studies on meteorological impact/risk assessment on agriculture and food production; global actions and agreements; impact on agricultural productivity and food security; and sustainable production and consumption in agriculture and the food industry

Module 2: Understanding climate change resilience, adaptation, and mitigation in agriculture

Concepts, principles, and features of climate change resilience, adaptation and mitigation; greenhouse effect and global warming; radiative forcing and global warming potential of

greenhouse gases (GHGs); agriculture as a significant cause of GHG emissions; resilience, adaptive capacity, and vulnerability to climate change; and strategies for adaption and mitigation such as specific actions and system changes

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

Module 3: Technological advances and digitized methodologies for climate change studies

Integrated data collection, utilization, and management in agriculture and food supply chains; agricultural information management and dissemination systems; early warning systems; resource-smart approaches in agricultural production; precision agriculture; and controlled-environment agriculture (e.g., plant factories)

Module 4: Climate change-resilient management of land, soil, and water resources

Sustainable land management; increasing soil fertility; restoring degraded soil; increasing soil organic matter; drainage and irrigation systems; flood information systems; monitoring and evaluation mechanisms for climate change-resilient natural resource use; codes of conduct to protect biodiversity; and enhancing land and water resource productivity

Quiz 2 (for self-assessment based on questions from Modules 3 and 4)

Model 5: Sustainable management of crops and livestock

Seed variety development as an adaption strategy; modern concepts of crop productivity; global demand for livestock production; impact of climate change on livestock; the livestock sector as a key player in GHG emissions; quantity and quality of feed and heat stress on livestock; controlling pests and diseases; codes of conduct for livestock rearing; environment-friendly methods of dairy and meat product development; and agricultural and food waste management

Model 6: Inclusive policies and social protection in responding to climate change

Gender-sensitive policies for evaluating climate change adaptation; women's leadership for dealing with climate change impacts; rural community efforts to engage the youth and elderly for local knowledge sharing; and initiatives and schemes for less-privileged groups such as weather based-insurance for small farmers

Module 7: Key success factors in developing climate change-resilient agriculture

Identifying current issues and indigenous climate change-resilient principles and practices; integration of resilient approaches in regional policy and advisory services; capacity development of stakeholders; and strategies for knowledge sharing and effective dissemination

Quiz 3 (for self-assessment based on questions from Modules 5, 6, and 7)

Module 8: Final examination

Methodology

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

11. Qualifications of Candidates

The target participants are policymakers and officials working for sustainable agriculture; representatives of producers' associations who want to practice climate change-resilient agriculture; consultants, trainers, and professionals engaged in climate change advisory services in agriculture; and those who want to expand their knowledge of climate change-resilient agricultural methodologies.

12. Eligibility for e-Certificate

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

Note: 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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