



## PROJECT IMPLEMENTATION PLAN

Ref. No. 19-AG-17-GE-DLN-A-AP04-PP2000015-002

<b>PIP Issue Date1</b>	30 April 2020
<b>Project Code</b>	19-AG-17-GE-DLN-A-AP04
<b>Title</b>	Self-learning e-Course on Future Aquaculture Farming
<b>Reference</b>	Project Notification on Self-learning e-Course for the Agriculture and Food Sectors 19-AG-17-GE-DLN-A dated 27 November 2018
<b>Timing and Duration</b>	3 August 2020-2 August 2021 (365 days)
<b>Venue</b>	e-learning
<b>Implementing Organization(s)</b>	APO Secretariat
<b>Number of Participants</b>	Minimum 400 participants
<b>Number of Local Participants</b>	
<b>Self-registration</b>	<p>Self-registration opens from 10:00 AM Japan Standard Time on 3 August 2020 on the eAPO web portal:</p> <p><a href="http://eAPO-tokyo.org">http://eAPO-tokyo.org</a></p> <p>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.</p>

## 1. Objectives

1. To offer participants information on future aquaculture farming;
2. To promote the productivity and effectiveness of aquaculture in member countries; and
3. To promote aquaculture and food production while contributing to meeting the UN Sustainable Development Goals (SDGs), particularly SDG 1 (ending poverty in all its forms everywhere) and SDG 2 (ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture).

## 2. Background

Global fish production is increasing yearly, reaching 171 million tons in 2016. Although capture production has been unchanged since 1990, aquaculture production has been constantly increasing. In 2016, 47% of global fish production was from aquaculture. Five APO member countries (Bangladesh, India, Indonesia, Thailand, and Vietnam) are listed in the top 10 aquaculture producers in the world, and five more (the ROC, IR Iran, Japan, the ROK, and the Philippines) are listed in the top 20. The APO collectively contributed more than one-fifth of world aquaculture production in terms of quantity. Aquaculture is an important industry in APO member countries to support local economies and the food supply.

When aquaculture was developed more than 3,000 years ago in China, freshwater species such as carp were the main products. In Europe, eels and oysters were produced in aquaculture during the Roman Empire. Today, advances in aquaculture technology have resulted in the production of a variety of fish and seafood.

This course introduces various aspects of aquaculture covering hatchery technology, formulated feed, fish diseases, recirculating aquaculture, and aquaponics.

## 3. Scope and Methodology

### Scope

The tentative course structure and contents are as follows:

#### Module 1. Hatchery technology: Live feed

- 1.1 Phytoplankton
- 1.2 Rotifer culture
- 1.3 Artemia culture
- 1.4 Nutritional enrichment
- 1.5 Maintenance in seed production tanks

#### Module 2. Hatchery technology: Fish seed production

- 2.1 Outline of seed production procedures
- 2.2 Broodstock management
- 2.3 Causes of early larval mortality
- 2.4 Aggressive behavior and cannibalism
- 2.5 Larval feeding ecology

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

#### Module 3. Formulated feed for aquaculture: Larval feed

- 3.1 Types of feed

- 3.2 Advantages/disadvantages of larval feed vs. live prey
- 3.3 Differences between larval feed vs grow-out feed

#### **Module 4. Formulated feed for aquaculture: Feed for growth stages**

- 4.1 Protein requirements
- 4.2 Lipid requirements
- 4.3 Mineral requirements
- 4.4 Vitamin requirements
- 4.5 Feed ingredients
- 4.6 Feed development for low/nonfish-meal feed

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

#### **Module 5. Fish diseases**

- 5.1 Viral diseases
- 5.2 Bacterial diseases
- 5.3 Parasitic diseases

#### **Quiz 3 (for self-assessment based on questions from Module 5)**

#### **Module 6. Recirculating aquaculture and aquaponics**

- 6.1 Material flow in aquaculture and water pollution
- 6.2 Principles and components of recirculating aquaculture systems
- 6.3 Advantages of recirculating aquaculture
- 6.4 Principles and methods of aquaponics
- 6.5 Use applications of aquaponics

#### **Quiz 4 (for self-assessment based on questions from Module 6)**

#### **Module 7: 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.

#### **4. Qualifications of Candidates**

The target participants are government officers, aquacultural producers, food business entrepreneurs, aquacultural extension workers, academics, and other individuals with particular interest in adopting advanced technology in aquaculture.

#### 5. Eligibility for e-Certificate

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

A handwritten signature in black ink, appearing to read 'Dr. AKP Mochtan', with a long, sweeping flourish extending to the right.

Dr. AKP Mochtan  
Secretary-General