

**Thailand's Annual International Training Course (AITC) 2017**  
**Modern Technology for Sustainable Agricultural Systems (MoTSAS)**

**I. Course Title:** Modern Technology for Sustainable Agricultural Systems (MoTSAS)

**II. Duration:** 4 - 20 July 2017

**III. Closing Date for Application:** 19 May 2017

**IV. Background and Rational**

The world population is projected to reach 9 billion by 2050. Therefore, managing agricultural production systems on a sustainable basis is one of the most critical challenges for the future of humanity. Technology advancement must be utilized to provide farmers with tools and resources in making farming more sustainable. Modern technologies in agricultural systems have been given an important role for the improvement of agricultural productions e.g. crop yield, livestock production, aquaculture production, and sustainable agriculture, in order to maintain food security.

It has been known that modern agricultural technology can sustainably improve agricultural production. Best management practice, which is widely applied nowadays, focuses on application of many technologies in a concerted manner. The modern technologies, such as new disease resistant hybrids, biological pest control, reduced pesticide use, cultural practices that can reduce the incidence of pests and diseases, and better placement and reduced amounts of fertilizers, insect-specific chemicals and biological insect controls are now being utilized instead of broad-spectrum pesticides, which actually reduce the number of sprays needed and therefore its capitals. Organic farming by using only organic fertilizer has helped farmers to reduce costs and improve productivity. Crop models, GIS, and remote sensing can provide farmers with information for realizing precision agriculture, which is done by matching inputs based on actual yields of different portions on the field. These tools also allow farmers to be able to manage land for both agriculture and wildlife.

This training course presents an opportunity to learn and discuss several concepts of modern technology for sustainable agricultural systems and their application. Emphasis will be placed on 1) Philosophy of Sufficiency Economy (SEP) and New Theory: Integrated and Sustainable Agricultural System; 2) Principles of genetics for the improvement of agricultural production; 3) Integrated pest management; 4) Applications of crop model, GIS and remote sensing related to agricultural systems; 5) Concepts of organic farming and organic fertilizers; and 6) Animal production and fisheries. After successful completion of this training course, participants are expected to understand the philosophy of sufficiency economy, concepts of modern technology in sustainable agricultural systems and how they are developed.

Participants are also expected to be able to further develop their knowledge and skills in applying philosophy of sufficiency economy and applications of modern technology to the case of their respective countries/territories regarding sustainable agriculture.

**V. Course Objectives:** At the end of this training course, participants will be able to;

- Understand philosophy of sufficiency economy and its applications in sustainable agriculture.
- Understand fundamental scientific knowledge and skills in applying modern technology for sustainable agricultural system.
- Understand important elements and principles of modern technology for sustainable agricultural systems, especially, biological control, biotechnology, improving soil fertility, crop modelling, GIS and remote sensing, tropical animal production and nutrition, natural animal and aquaculture production
- Develop necessary skills in practical modern technology for sustainable agricultural systems.

## **VI. Course Contents**

**6.1 Course Outline:** Main topics include;

- Philosophy of sufficiency economy and New Theory
- Sustainable development concept and application
- Farming system research
- Seed science and technology
- Important natural enemies to control insect pest in rice
- Mass rearing technique of certain natural enemies
- Basic concepts and applications of crop model for the improvement of crop production; precise integrated crop management
- Introduction and applications of biotechnology in agricultural systems
- Basic concepts of plant diseases
- Applications of GIS and remote sensing in plant diseases
- Organic Bio-fertilizer production
- Microbial fertilizers for soybean and rice production
- Postharvest science and quality management of value-added horticultural products
- Food Safety part I: Risk assessment and GAP standard (Global GAP)
- Food Safety part II: Law & Regulation
- Applications of molecular genetic markers for modern livestock production
- Applications of Near-infrared spectroscopy (NIRS) in animal productions
- Appropriate technology in aquaculture

**6.2 Practices:** Practice topics include;

**Seed science and technology**

**Plant biotechnology laboratory**

- Techniques in plant tissue culture and applications

**Biological control for pest management in rice production**

- Sampling technique in rice paddy field
- Identification of insect pest and their natural enemies in rice
- Rearing technique of certain natural enemies

**Crop model**

- Software installation (WaNuLCAS model)
- Understanding input parameters, calibration and validation of crop model based on agroforestry systems
- Interpretation and discussion on model outputs
- Application of crop model to special cases related to agricultural production

**GIS and remote sensing**

- Introduction to GIS and remote sensing
- Application of GIS and remote sensing to special cases related to plant diseases

**A principle laboratory on quality measurement and fruit tasting**

**Application of microbial fertilizer**

**Appropriate aquaculture techniques**

- Fish culturing system in lower northern Thailand

**6.3 Study Trips/ Field Trips:** study trips/ field trips include visits to;

- Naresuan University (NU) Campus tour e.g. textile museum, NU library and School of Renewable Energy Technology (SERT)
- Biological Control Research Center
- Chaipattana Foundation
- Bangmoonak Bhumiwittayakom school, Phichit province
- Organic bio-fertilizer plant at Wang Thong district, Phitsanulok province
- Thai native chicken and fighting cock farms, Phitsanulok province
- Research field at Bueng Rachanok, Phitsanulok for aquaculture production

## **VII. Attendance, Evaluation and Assignments;**

Participants are required to attend all activities organized during the course as attendance in all sessions is obligatory. TICA reserves the rights to revoke its fellowship offer or take appropriate action deemed appropriate in case a participant is in attendance of less than 90 percent of the training hours.

### **Advance Assignments**

#### **Country Report**

Participants are required to prepare a country report introducing situation in their country/territory related to the training topic and prepare for 8-10 minute presentation.

#### **Reading Assignment**

- "Toward Sustainable Agricultural Systems in the 21st Century", National Academies Press (2010) 570 pages.

- "WaNuLCAS model manual": available from the website:

<http://www.worldagroforestry.org/sea/Products/AFModels/wanulcas/download.htm>

#### **Project Assignment**

It is advisable that all participants should bring their own experimental data e.g. daily weather, soil physical and chemical data, crop management, crop characteristics, and crop growth analysis. These data will use to apply with WaNuLCAS model. Participants are expected to develop a skill in designing agricultural systems based on their own data set by using WaNuLCAS model.

#### **Group presentations**

6 group presentations will be assigned for participants. The presentation topic will be related to 1) conclusion of concepts introduced during lectures and study trips/field trips and 2) how to introduce the modern technology for sustainable agricultural systems to farmers and motivate them to put it into practice. After each group presentation, there will be questions and answers, discussions, and comments by academic members of the University and other participants.

## **VIII. Number of Participants: 20 persons**

## **IX. Qualifications**

Candidates must possess qualifications as specified in "Guideline for Thailand's Annual International Training Course Programme" No. 2 "Qualifications." Moreover, candidates with the following qualifications are preferred.

- Graduated with university degree in relevant fields
- Currently work in agricultural field, especially as a researcher, lecturer/teacher or farmers.
- Has basic knowledge on agricultural systems.
- Has basic computer skill (Microsoft Windows & Microsoft Office).

**X. Venue and Training Institution:**

Faculty of Agriculture Natural Resources and Environment,  
Naresuan University,  
Phitsanulok, 65000, Thailand.

**XI. Contact**

For more information, please contact;  
Bureau of International Cooperation on Human Resource Development  
Thailand International Cooperation Agency (TICA)  
Government Complex, Building B, 8<sup>th</sup> Floor, Chaengwattana Rd. Laksi District,  
Bangkok 10210 THAILAND  
Website: [www.tica.thaigov.net](http://www.tica.thaigov.net)  
Email: [aitc@mfa.go.th](mailto:aitc@mfa.go.th)

\*\*\*\*\*