Annual International Training Course 2014

1. Course Title:

Modern Technology for Sustainable Agricultural Systems (MoTSAS)

2. Duration:

Wednesday, July 23 – August 8, 2014 (18 Days)

Closing Date for Applications: June 15, 2014

3. Background and Rationale

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. Technological advancements must be used to provide farmers with tools and resources to make farming more sustainable. Concepts of modern technologies in agricultural systems have given an important rolefor the improvement of agricural productions e.g. crop yield, livestock production, aquaculture production, and sustainable agriculture, in order to maintain food security.

It has been shown that modern agricultural technology can substantially improve agricultural production and sustainability. For instance, best management practices are widely applied nowadays. It relies on targeting many of their applications, not broadcasting as was done in the past. 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 are all being employed. 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 products. 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 agriculture to manage land for both agriculture and wildlife.

In this training course, we will present and discussseveral concepts of modern technology in sustainable agricultural systems and their development. Emphasis will be placed on 1) Principles of genetics for the improvement of agricultural production; 2) Integrated pest management; 3) Applications of crop model, GIS and remote sensing related to agricultural systems; 4) Concepts of organic farming; and 5) Concepts of organic fertilizers.After successful completion of this training course, participants are expected to understand the concepts of modern technology in sustainable agricultural systems and how they are developed. The participants should be able to further developtheir knowledge and skills in applying modern technology to their own questions regarding sustainable agriculture.

Currently, Department of Ageicultural Science, Faculty of Agriculture Natural Resources and Enviroment, Naresuan University has 30 academic staffs with a broad array of specializations. About 90% of the staff members holds the doctorate degree. Members in the department specialize in many aspects of agricultural science and technology that cover in the broad area such as biological control, integrated pest management, bio-pesticides, plant growth promotion by PGPR, plant breeding, production of plant-secondary metabolites by tissue or cell culture, plant molecular genetics, soil mirobiology, organic farming, post-harvest technology and quality control, crop modelling, GIS and remote sensing, tropical animal production and nutrition, natural animal and aquaculture production.

Concerning relevant facilities in the Faculty of Agriculture Natural Resources and Enviroment, Naresuan University, there are 11 laboratories, i.e., National Biological Control Research Center, Plant Biotecnology Laboratory, Postharvest Technology Laboratory, Agriculture Microbiology Laboratory, Plant Pathology Laboratory, EntomologyLaboratory, Weed Science Laboratory, Quality Control of Fresh Fruits and Vegetables Laboratory, Plant Nursery and Experiment Farm, GIS Center, Animal Science and Animal Nutrition Laboratory, and AquacultureLaboratory. They are all equipped with necessary tools for their research specialities.

4. Objectives

- To introduce fundamental scientific knowledge and skillin modern technology for sustainable agricultural system.
- To provide important elements and principles of modern technology for sustainable agricultural systems with reference to biological control, biotechnology, improving soil fertility, crop modelling, GIS and remote sensing, tropical animal production and nutrition, natural animal and aquaculture production
- To develop necessary skills in practical modern technology for sustainable agricultural systems.

5. Course Contents

5.1 Course Outline

Day 1
-Sustainable development concept and application
-Lecture: Farming system research
Day 2
-Seed science and technology part I and II
Day 3
-Important natural enemies to control insect pest in rice
- Mass rearing technique of certain natural enemies
Day 6
-Food Safety part I: Risk assessment and GAP standard (Global GAP)
Day 7
-Food Safety part II: Law &Regulation
Day 8
- Introduction and applications of biotechnology in agricutural systems
Day 9
- Basic concepts of plant diseases
-Applications of GIS and remote sensing in plant diseases
Day 10
-Organic Bio-fertilizer production
Day 13
-Microbial fertilizers for soybean and rice production
Day 14
Basic concepts and applications of crop model for the improvement of crop production; precise integrated crop management
Day 15
- Postharvest science and quality management of value-added horticultural products
Day 16
-Semi-bio pig production
-Applications of molecular genetic markers for modern livestock production
-Applications of Near-infrared spectroscopy (NIRS) in animal productions

Day17

- Appropriate technology in aquaculture

5.2 Practices

-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 techique 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 agricutural 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

-Semi-bio pig production

- Techniques essential for raising pigs in semi-bio production system

-Appropriate aquaculture techniques

- Fish culturing system in lower northern Thailand

5.3 Study Trips/ Field Trips

Day 1 (in the morning): Naresuan University(NU) Campus tour for giving information to participants e.g. textile museum, NU library and the school of Renewable Energy Technology (SERT)

Day 3 (in the afternoon) Study trip to Biological Control Research Center for developing an idea about practical biological control using for sustainable agricultural systems

Day 5 (whole day): Sightseeing Guides and Trips in Phitsanulok

Day 10 (in the afternoon): Visit an organic bio-fertilizer plant at Wang Thong district, Phitsanulok

Arrive at Sukhothai Historical Park, Sukhothai Province (a short tour and dinner)

Sukhothai Night (special light and sound/cultural performances).

Day 16 (in the afternoon):

-Visit a research farm at semi-bio pig production at Bueng Rachanok Research Station, Wang Thong district, Phitsanulok

- Thai native chicken and fighting cock farms at private chicken farm within Phitsanulok province

Day 17 (in the afternoon): Visit a research field at Bueng Rachanok, Phitsanulok for aquaculture production

Day 18: Travel to Sukhothai airport, Guided tours: Organic Rice Farm

Visit Pak Kaew Model (a learning center for agriculture)

Sukhothai Night (special light and sound/cultural performances) and

Closing ceremony

5.4 Advance Assignments

1) Country Report

Participantswill be asked to briefly introduce about their country and experience in agricultural systems.About 8-10 minute presentation will be organized for each participant.

2) Reading Assignment

- Toward Sustainable Agricultural Systems in the 21st Century. National Academies Press (2010) 570 pages.
- WaNuLCAS model manual: avaiable from the website:
http://www.worldagroforestry.org/sea/Products/AFModels/wanulcas/download.htm

3)Project Assignment

We invite all participants to bring his/her 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 test with WaNulCAS model. Participants will develop a skill in designed agricultural systems based on their own data set by using WaNuLCAS model.

6. Number of Participants: 20 persons

7. Participants Criteria

- Participant is a residentof one of the following countries(see 8. Invited Country).
- Participant for this training course should graduate from university and currently involve in agriculture field related to research, lecture/teaching or farmers.
- Participant has basic knowledge in agricultural systems.
- Participant should be able to communicate (speaking and writing)in English and he/she should have a basic computer skill (Microsoft Windows & Microsoft Office).

8. Eligible Country

Asia & Middle East: Bangladesh, Jordan, Maldives, Pakistan, Tajikistan, Timor-Leste, Thailand
Oceania (Pacific Islands): Fiji, Cook Island, Solomon Island, Marshall Island, Vanuatu
Africa: Angola, Eritrea, Ethiopia, Gambia, Gabon, Mali, Nigeria, Zambia
America (Latin America & others): Argentina, Bahamas, Chile, Ecuador, Mexico, Peru

9. Venue

The training course will be mainly arranged at the Faculty of Agriculture Natural Resources and Enviroment, Naresuan University,Phitsanulok, 65000, Thailand.
For accommodation of participants, we will reserve rooms at hotels nearby Naresuan University.

10. Expected Results

After successful completion of this training course,the participants are expected to

- Have knowledge, understanding and skills required to manage agricultural production systems in a socially and environmentally responsible manner.
- Have knowledge of, and skills in, decision-making and the evaluation of technology and management techniques used in sustainable agricultural systems.

11. Evaluation

- Participants must strictly attend classes as scheduled.
- Group presentations (6 groups) will be assigned for participants. The criteria will be related to 1) conclusion of concepts gatheringduring 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, discussions,and comments by academic members and other participants.

Fellowship Arrangements:

1. Application Procedures

- Applicants interested in participating in the course must be nominated by their government and must submit three (3) completed nomination forms to the Royal Thai Embassy or Consulate in their respective countries before the closing date of application.
- In general, each country may nominate up to four (4) nominees for the course. However, nomination for certain courses may be limited to one or two nominees from each country due to limited seat available for participation.
- The Royal Thai Government will inform the nominating government (or relevant authority) whether or not nominee(s) have been accepted for the course, normally three weeks before the course starts.
- Further information about training courses held under AITC can be obtained from TICA's website: http://www.tica.thaigov.net/main

2. Allowances and Expenses

The Royal Thai Government will be responsible for the following allowances and expenses:

- An economy class electronic ticket (e-ticket) will be issued to each participant via email. Each of the participants is not allowed to change the flights route and schedules. Participants should not buy air tickets by themselves and should be advised that if they do so, the cost cannot be reimbursed from the Royal Thai Government. The Royal Thai Government will also arrange the domestic flight in Thailand for participants, if any.
- Each participant will receive a living allowance of 500 Baht (US$17) per day to cover meals, local transportation and other personal daily expenses. Accommodation will be arranged by the Royal Thai Government and all participants will stay at the same place. It is suggested that each participant should bring some pocket money approximately US$100 to cover the expenses before the allowance is paid.
- Minor medical treatment will be provided for participants who become ill during their stay in Thailand.
- The Royal Thai Government will provide transportation for the authorized field trips undertaken as part of the course.

3. Regulations

Participants are required to observe the following regulations:

- Participants must only stay at the places designated by the Royal Thai Government.
- Participants must strictly attend classes as scheduled and should not change their training subjects.
- Participants must not extend the training period.
- Participants must not bring any family members with them to Thailand.
- Participants must return to their home countries after the course completion (at the date as scheduled by the Royal Thai Government).
- Participants are required to travel only on the route designated by the Royal Thai Government and must not make any alterations. Please also be informed that the maximum allowable baggage that can be loaded on flights is 20 kilograms. Participants will be responsible for any cost incurred in exceeding this limit.
- Participants must observe rules and regulations of training institute(s).

- Participants must refrain from engaging in political activities, or any form of employment for profit or gain.

4. Visa Procedures

Prior to departure from their home country to Thailand, all participants must first obtain the appropriate visa from the Royal Thai Embassy or Consular representative in their countries. Presentation of the acceptance letter is required when applying for VISA. A maximum of 2,000 Baht VISA fee (approximately US$ 60) must be paid by a participant to the Royal Thai Embassy or Consular representative. Participants must request for the original receipt which could be later on reimbursed from the Royal Thai Government upon presenting the original receipt.

Further relevant information is available at the following addresses:

Human Resource Development Bureau (HRD Branch 2)
Thailand International Development Cooperation Agency
The Government Complex
Building B (South Zone) 8th Floor,
Chaengwattana Road, Lak Si, Bangkok 10210
Tel (662)203-5000 ext 43305
E-mail: tica@mfa.go.th
Website: http://www.tica.thaigov.net/main

Institution

1. Executing/Implementing Agency

Implementing Agency: Department of Agricultural Science, Faculty of Agriculture Natural Resources and Enviroment, Naresuan University
Academic members and staffs are about 40 persons.
Members in department specialize in Agricultural Science and Technology that cover broad areas such as biological control, integrated pest management, bio pesticides, plant growth promotion by PGPR, plant breeding, production of plant secondary metabolites by tissue or cell culture, plant molecular genetics, soil microbiology, organic farming, postharvest technology and quality control, crop modelling, GIS and remote sening, tropical animal production and nutrition, natural animal and aquaculture production.
Training Materials/Equipment Availability: Computer room, Crop modelling software
Accommodation for participants: Hotel near Naresuan University
Address: Department of Agricultural Science, Faculty of Agriculture Natural Resources and Enviroment, Naresuan University, Phitsanulok, 65000, Thailand
Tel: (+66) 55-962710 Fax. (+66) 55-962709
Contact information: Dr.Wanwisa Pansak
Department of Agricultural Science, Faculty of Agriculture Natural Resources and Enviroment, Naresuan University, Phitsanulok, 65000, Thailand
Tel: (+66) 55-962724 Fax. (+66) 55-962709 Mobile (+66) 815346644
Email: wpunsak@yahoo.com and wanwisapa@nu.ac.th

2. Collaborative Organizations

1.Prof. Dr. Georg Cadisch
Institute Plant Production in the Tropics and Subtropics, Hohenheim University, Garbenstrasse 13, 70599 Stuttgart, Germany
2. Assist. Prof. Dr. Vicharm Amarakal, School of Liberal Arts, University of Phayao
3. ApiwanVarin, Department of Agriculture, 65000, Phitsanulok, Thailand