Course outline for Annual International Training Course: AITC

Online International Training Course on
"Development of Agricultural Resilience Capacity through Water Management with Climate Smart Irrigation System"

1. Course Title:

Development of Agricultural Resilience Capacity through Water Management with Climate Smart Irrigation System

2. Duration: 2 weeks (during the 3rd - 4th Week of July 2022)

3. Background and Rationale:

Irrigation plays an important role in global food security, it is also the major single water user globally, accounting for about 70 percent of water abstracted from surface and groundwater resources. The expansion of irrigated areas and the shift towards more water intensive foods, coupled with growing water demand by other sectors make water an increasingly scarce resource in many regions of the world. Scarcity and competition for water are expected to be exacerbated by climate change, as rainfall amounts are projected to decline or change the seasonal pattern, particularly in dry areas, and rising temperatures will increase crop evapotranspiration rates and hence water demand by irrigation.

However, the irrigation also contributes to climate change through greenhouse gas (GHG) emissions from fossil fuel powered water pumping, intensive use of mineral fertilizers, and the fossil fuel powered machinery and automation used at all stages, from the cultivation of crops through to the final phase of value chains. Such a shift will support progress towards several interlinked goals on the 2030 Agenda for Sustainable Development,

in particular Sustainable Development Goal (SDG) 6: Ensure availability and sustainable management of water and sanitation for all; SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture; and SDG 13: Take urgent action to combat climate change and its impacts.

Hence A holistic and coordinated approach is needed to address these interlinked challenges and support the transition to irrigation systems that are productive and profitable while, at the same time, being resilient and well adapted to climate change, minimizing GHGs emissions and ensuring the sustainable use of water resources. For example, large-scale irrigation has recently declined, the reasons are the exhaustion of suitable sites in major irrigation countries like in Asia and the increasing costs of new developments. Hence it has now been established that small-scale irrigation developments which allow for more participation and decision-making of farmers are generally most successful. The benefits of knowledge and technology revolution have brought the smart irrigation system into the agriculture system. The tailor watering schedules and run times automatically is operated to meet specific landscape needs. These controllers significantly reduce water waste due to overwatering while increasing water use efficiency and also result in a reduction of greenhouse gases emission etc.

Climate-smart irrigation (CSI) has been developed with the objectives including:

- Increasing the productivity of irrigated cropping systems and incomes derived by farmers in ways that minimize risks of trade-offs or externalities that may be politically, socially or environmentally unacceptable
- Increasing the resilience of irrigated cropping systems and related value chains to current and potential future climate change impacts and other sources of immediate and longer-term risk and uncertainty
- Adapting irrigated cropping systems and related value chains to anticipated climate change in ways that take advantage of new opportunities that may arise as a result of climate change, and reduce its direct or indirect negative impacts.
- Identifying and reducing greenhouse gas emissions for food produced by irrigated cropping systems up to and beyond the farm gate.

- Improving the environmental sustainability of irrigated cropping systems and value chains while safeguarding the basic human water requirements of rural and urban water users and also the functionality of aquatic ecosystems.

Therefore, this training course was developed in order to enhance knowledge, skill, and the capacity of trainees in water management for the agriculture system under the context of CSI. The course will deliver the experience to trainees with a variety of activities including lectures, VDO site visits/case study and sharing with Thai experts. This course will be led by the department of irrigation engineering, Kasetsart University, Kamphaeng Saen Campus, the Thai leader in an irrigation-agriculture academic institute, in the partnership of Royal Irrigation Department, Ministry of Agriculture and Cooperatives and Tonpanya Farm (farm to fork). All members of the organizing team are the core institutes who are working under the societal challenge on how to match citizens 'needs and activities with reasonable use of the available resources. This could provide the opportunity to develop the network of workforces from many regions in the world in terms of exchange of knowledge and experiences and the cooperation will be projected after training.

4. Objectives

- To introduce the principle concept of irrigation development and water management in the context of climate change.
- To introduce the concept of GHGs emissions reduction from irrigation schemes in order to improve and maintain the resilience to climate change.
- To introduce the principle concept and implication of smart farming and IOT for the modern irrigation system.

5. Course Contents

Course outline: Three learning modules will be delivered during the course

Module 1 Irrigation sector challenges in the face of climate change: This module aims to provide a principle and development of irrigation system, water demand and supply estimation. A principle and concept of Climate smart irrigation (CSI) and its implication, LCA and water footprint, reducing GHGs emission, Improving and maintaining the resilience of irrigation schemes. Principle and best practice for participatory irrigation management and the case study in Thailand**.**

Module 2 Modern technologies for irrigation and water management: This module will provide the principle of irrigation technology such as smart farming and the use of IoT for modern irrigation systems, GIS remote sensing and UAVs application for crop water requirement and drought monitoring. The principle of plant physiology and an application to the watering system. The participants could observe and experience several irrigation technologies and the case studies in Thailand.

6. Number of participants: 20

7. Participants criteria:

The participants should meet the following criteria:

1. Be nominated by their government
2. Has been working related as agriculture, irrigation, environment, and water management personnel for at least 2 years
3. Good command of English language in speaking, reading, and writing skills
4. Computer literate
5. Able to fully participate throughout the training course
6. Submit curriculum vitae

8. Invited countries

Bangladesh, Bhutan, Botswana, Burkina Faso, Burundi, Cambodia, China, Côte d'Ivoire,
Egypt, Ethiopia, Gambia, Ghana, India, Indonesia, Jordan, Kenya, Lao PDR, Libya, Lesotho,

Madagascar, Malawi, Malaysia, Maldives, Mauritius, Mozambique, Myanmar, Nepal, Oman,
Pakistan, The Philippines, PIF Member Countries, Rwanda, Sri Lanka, Senegal, Sudan,
Tajikistan, Timor Leste, Tunisia, Uganda, Uzbekistan, Vietnam and Thailand

9. Venue

Online: Meeting room at Department of Irrigation Engineering, Faculty of Engineering at Kamphaengsaen, Kasetsart University, Kamphaengsaen Campus, Nakhonpathom, Thailand 73140

10. Expected results

- Participants could be able to describe the concept of irrigation development, adaptation and resilience development for an agricultural system under the challenge of climate change.
- Participants could be able to identify and share the area of improvement in their water management and irrigation systems for better outcomes.
- Participants gain experience of smart irrigation systems and create networking among their group in order to share their future work in different contexts.
- Participants could be able to develop a plan for strengthening their water management and irrigation system to improve productivity and resilience.

11. Evaluation

- Participants will be evaluated their achievement by analysis of their knowledge through discussion and practice evaluation
- A Certificate will be conferred if they could attend the course not less than 80%.

12. Institution

Executing/implementing agency

Address: Department of Irrigation Engineering, Faculty of Engineering at Kamphaeng Saen, Kasetsart University, Kamphaeng Saen Campus, Nakhonpathom, Thailand 73140

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Collaborative Organizations

Irrigation Department, Ministry of Agriculture and Cooperatives and Tonpanya Farm.

13. Expenditure / Funding

This training is funded by TICA

Tentative Schedule for
Thailand's Annual International Training Course (AITC) 2022
Online International Training Course on "Development of Agricultural Resilience Capacity through water Management
with Climate smart Irrigation System" During July 18th – 30th 2022

1st Week	Monday July 18, 2022	Tuesday July 19, 2022	Wednesday July 20, 2022	Thursday July 21, 2022	Friday July 22, 2022	Saturday July 23, 2022	Sunday July 24, 2022
	Module 1						
9.00-12.0	9.00-9.30 Opening ceremony: Opening speech by Dean of Engineering Faculty KPS Welcome address by TICA Rep. 9.30-12.00 A principle and development of irrigation system	Climate change impact on irrigation and water management, the principle and concept of climate smart irrigation system	Reducing GHGs emission from agricultural sector in order to improving and maintaining the resilience to climate change	The principle and concept of Life cycle assessment and water footprint	Principle and best practice for participatory irrigation management and the case study in Thailand	Practice/ Assignment / Presentation	
2nd Week	**Monday July 25, 2022**	**Tuesday July 26, 2022**	**Wednesday July 27, 2022**	**Thursday July 28, 2022**	**Friday July 29, 2022**	**Saturday July 30, 2022**	**Sunday July 31, 2022**
	Module 2						
9.00-12.0	The principle of plant physiology, plant stress and coping with water scarcity.	GIS remote sensing and UAVs application for crop water requirement and the case study in Thailand.	Practice/ Assignment / Presentation	Smart farming and the use of IOT for modern irrigation system and the case study in Thailand.	Practice/ Assignment / Presentation	Wrap up, way forward and evaluation / Closing ceremony and certification distribution	

This schedule may be subject to change, depending on the circumstances