**Course Outline**

**Annual International Training Course**

**Course title**

**"Integrating Climate Change Adaptation
into Food Security and Natural Resource Management"**

**Duration**

7–19 July 2025 (13 days)

**Background**

### Thailand International Cooperation Agency (TICA)

TICA is a national focal point for Thailand's international development cooperation. It was established in 2004 to realize Thailand's aspiration to be a contributor to international development cooperation. Believing that global challenges are best addressed through international cooperation and global partnership, TICA continues to work closely together with its development partners to realize the global development agenda though various capacity-building and human resources development programs. In response to the recent changes in the global landscape of development cooperation, TICA has strengthened its partnerships to harness the synergy of South-South and Triangular Cooperation to tackle global development challenges, including expediting the implementation of Sustainable Development Goals (SDGs). It also continues to realign our focuses in order to deliver Thailand's commitments as a global reliable partner.

Since 1991, TICA, in collaboration with education institutions in Thailand, has offered short-term training courses under its Annual International Training Course (AITC) program. The number of courses offered each year varies between 25 to 35 courses for 20 participants per course. AITC not only fosters good and friendly relation which Thailand has already enjoyed with recipient countries across regions, but also helps Thailand to reach out to those countries with which we desire to engage more closely. The courses offered by TICA in 2023-2025 are categorized into 5 themes: Sufficiency Economy Philosophy (SEP), food security, climate change and environmental issues, public health, BCG Model related.

### Organization/institution

**Kasetsart University Faculty of forestry (KUFF)** was firstly established on 1st May **1936** as a Forest School in Phrae province, northern Thailand. The school was renamed as the Forestry School and the College of Forestry in **1939** and **1947**, respectively. Since then, it has been the only faculty in Thailand that offers higher education and degrees in forestry and related fields. At present, the Faculty of Forestry consists of the six departments including Forest Management; Forest Biology; Forest Products; Silviculture; Forest Engineering; and

Conservation.

The Faculty of Forestry offers an undergraduate program in a Bachelor of Science (Forestry) in the **8** majors comprising of Watershed and Environment Management; Forest Biological Science; Forest Engineering; Silviculture; Park, Recreation, and Tourism; Wildlife and Range Management; Forest Management; and Social Forestry. In addition, it offers **5** Master's degree programs including **(1)** Forestry; **(2)** Forestry Resource Management; **(3)** Forest Biological Science; **(4)** Parks, Recreation, and Tourism; and **(5)** Forest Resource and Environmental Administration. The M.Sc. (Forestry) comprises **5** branches namely **(1)** Watershed and Environment Management; **(2)** Forest Engineering; **(3)** Silviculture; **(4)** Wood Industrial Technology; and **(5)** Pulp and Paper Industrial Technology. Furthermore, the department offers a doctoral program, Doctor of Philosophy (Forestry) which consists of **7** branches such as **(1)** Forestry Resource Management; **(2)** Watershed and Environment Management; **(3)** Forest Ecology; **(4)** Forest Engineering; **(5)** Silviculture; **(6)** Wood Industrial Technology; and **(7)** Parks, Recreation and Tourism. Currently (in **2022**), there are **1316** bachelor students, **266** master students, and **32** doctoral students in the Faculty of Forestry, Kasetsart University.

Not only the comprehensive learning facilities at the Faculty of Forestry in Bangkok, but our undergraduate and graduate students also become familiar with forestry fieldwork and research by working and researching in **8** research and training stations of the faculty located throughout Thailand. Each of the research and training station situated in different forest types such as evergreen forest, dipterocarp forest, deciduous forest, restoration forest, agroforest, urban forest, and plantation.

### Program background
Since the 20th Century, climate change, particularly increasing temperatures, changing of precipitation pattern, and occurrence of extreme climate event has strong impact to ecosystem as well as carbon cycles in the world. The rate and scale of projected climate changes in the 21st century is likely to have profound impacts on the functioning of Earth's ecosystems. Global warming has changed the climate variability, which will cause more severe and extreme weather events in the future in the form of severe floods and droughts. Climate change impacts every type of natural resource. The impacts of climate change on forests will vary widely based on the species involved and other factors. With increasing $CO_2$, forest productivity will likely increase until other impacts of climate change, such as increased risks of drought, forest fire, pests, and invasive species present additional stressors to forests. The distributions of plant and animal species continue to change as rising temperatures alter ecosystems and amplify existing environmental concerns. In addition, climate change threatens our ability to ensure food security, eradicate poverty, and achieve sustainable development.

The climate change caused by increase in atmospheric concentration of $CO_2$ and other greenhouse gases (GHGs), can be addressed through adaptation and mitigation strategies. Mitigation and adaptation are the two primary instruments of the international climate convention to minimize negative impacts of climate change on humans and ecosystems. The less effective global mitigation is in reducing anthropogenic GHG emissions and increasing GHG sinks, and more adaptation is needed to avoid such negative impacts. Forests and climate change are intrinsically linked, in ways that extend beyond carbon. Forest ecosystems capture and store $CO_2$, making a major contribution to the mitigation of climate change. when forests are destroyed, over-harvested or burned, however, they can become a source of $CO_2$ emissions. From the perspective of climate, sustainable forest management is a means of achieving the goals outlined by the UNFCCC with respect to forests. Forests are used for carbon capture and

storage, thus reducing the emissions of greenhouse gases — in this way, forests become part of a climate strategy for mitigation. Forests and trees are also used as part of a strategy to cope with impacts of climate change — in this way, forests become part of a climate strategy for adaptation. For many years, forest policymakers, managers and practitioners have worked to conceptualize and implement sustainable forest management for climate change mitigation and adaptation.

In addition to the impacts of climate change to forests and their contribution to mitigation measures, climate change has both direct and indirect impacts on agricultural production systems. Southeast Asia is a vulnerable region in terms of climate change's effects. The region has experienced numerous climate change effects, including water shortages, heatwaves, forest fires, typhoons, and severe thunderstorms, due to its vast and diverse geography and dense population (hundreds of millions live in low elevation coastal zones). These extreme climate events could lead to food insecurity and breakdown of food systems. Conventional agriculture is the mainstream approach to achieving this target but has also caused extensive environmental and social harms so that an agriculture that can "multi-functionally" increase food production while simultaneously enhancing social and environmental goals is needed.

In Thailand, agroforestry practices which include multi-strata plant structures, mixed tree crop systems are widespread in various forms and under various types of management throughout the country. Growing trees on farms can buffer microclimates, modulate water flows, store carbon, and provide foods for local people. The local knowledge and experience on tree management in different farming systems, especially regarding their responses to their livelihood and climatic phenomena. This could also help communities devise multi-beneficial measures to adapt to increasing climate variability and predicted long-term changes in weather and seasonal patterns through switching to alternative/new livelihood options basing on available resources. Understanding farmers' strategies and agroforest patterns in adapting their agricultural activities to climate variability is an essential first step in identifying options that are effective and suitable to specific local contexts for coping with increased food security in the future. Local adaptation to climate and weather anomalies has evolved eventually. However, little of local adaptation knowledge on Agroforest models for climate change adaptation and coping with food insecurity for smallholders has been considered by national climate change adaptation programs. Therefore, availability of current agroforest practices in accordance with local people adaptation strategies in growing crops with various forest trees at the local level can facilitate them adaptations in national programs, especially for Thailand, where majority of the population are still farmers. In addition, climate change adaptation strategies and available adaptation options for this region are crucial, especially forest-based management to improve food security. A better understanding of how agroforestry systems can increase crop yield, crop resilience, and farm incomes is required, particularly among the most vulnerable food producers.

## Objective

The overall objective of the designed training program is to provide an understanding of the impacts of climate change on food security and natural resources. The program focuses on integrating climate change adaptation into food security and natural resource management through agroforestry system in both global and Southeast Asian contexts.

**Course content**

The course content is as follows:

- Overview of climate change and food security and natural resources;
- Climate change impacts on food security and natural resources and their adaptation;
- Agroforestry system to maximize carbon sequestration and enhance food security; and
- Integrated management of forest resources in the context of climate change mitigation and adaptation.

The lecture outline is as follows:

- Overview of climate change and food security and natural resources
- Policy context for forest-based climate change mitigation and adaptation
- Country situation in climate change, food security and forest resources
- Climate change impacts on forest resources and Forest-based mitigation options
- Forest and climate change mitigation through REDD+ mechanism
- Maximizing forest carbon through forest landscape approach
- GHG mitigation mechanism (carbon offsetting and trading)
- Forest carbon measurement and Monitoring
- Climate change vulnerability, impacts and adaptation assessment
- Climate change impacts on forest plantation management and adaptation options
- Community-based adaptation and resilience to climate change
- Climate change mitigation and adaptation on food security
- Interlinkages between land, water resources, food security and GHG Emissions: Synergies, trade-offs and integrated options
- Climate change mitigation through agroforestry system to enhance food security: agroforestry models with edible tress
- Good practices of agroforestry system of mixed species plantation intercropping with edible trees
- Integrating climate change adaptation into food security and natural resource management
- Field excursion (4 days)

| Time | Activity | Remarks |
|---|---|---|
| **Tentative Schedule** Venue: KUFF | | |
| **Day 1** | | |
| | Arrival of participants/Check-ins and registration of participants | The Secretariat |
| **Day 2** | | |
| 08.30-09.00 | **Opening ceremony and course orientation:** overview of the training objectives and expectations | |
| 09.00-12.00 | **Introduction to climate change and forest resources** *Lecture 1:* Introduction to climate change and forest resources (Part 1): Terminology, causes, trends, and the relationship between land-use change and climate change | KUFF Trainer |
| 13.00-16.00 | *Lecture 2:* Introduction to climate change and forest resources (Part 2): Food security and climate change | KUFF Trainer |
| 18.00 | Welcome Dinner | TBA |
| **Day 3** | | |
| 09.00-12.00 | **Policy and country perspectives** Country situation reports: presentations and discussions on climate change and forest resources | KUFF Facilitators |
| 13.00-16.00 | *Lecture 3:* Policy context for forest-based climate change mitigation and adaptation (International and regional levels) | Invited speaker (DCCE) |
| 16.00-16.30 | Recap and reflection session | KUFF Facilitators |
| **Day 4** | | |
| | **Forest-based mitigation and carbon management** *Lecture 4:* Climate change impacts on forest resources and mitigation options | KUFF Speaker |
| | *Lecture 5:* Forest carbon measurement and monitoring | KUFF Speaker |
| | Recap and reflection session | KUFF Facilitators |
| **Day 5** | | |
| | **Carbon offset mechanisms** *Lecture 6:* GHG mitigation mechanism: carbon offsetting and trading | Invited speaker (TGO) |
| | *Lecture 7:* Optimizing forest carbon: landscape approaches | KUFF Speaker |
| | Recap and reflection session | KUFF Facilitators |
| **Day 6** | | |
| | **Community adaptation and food security** *Lecture 8:* Community-based adaptation and resilience to climate change | Invited speaker (RECOFTC) |
| | *Lecture 9:* Climate change impacts and adaptation on food security | KUenvi Speaker |
| | Recap and reflection session | KUFF Facilitators |
| **Day 7** | | |
| | **Climate change mitigation through agroforestry: strategies for enhancing food security** *Lecture 10:* Climate change mitigation through agroforestry | KUFF Trainer |
| | *Lecture 11:* Good practices of agroforestry: mixed species plantation intercropping with edible trees for enhancing food security | KUFF Trainer |
| | Recap and reflection session | KUFF Facilitators |

| Tentative Schedule<br>Venue: KUFF | | |
|---|---|---|
| Time | Activity | Remarks |
| **Day 8** | | |
| 07.00-10.00 | Departure for field excursion | |
| 10.00-12.00 | **Field Excursion (Day 1)**<br>Commercial forest plantation management: industry insights | Invited speakers, KUFF facilitators |
| 13.00-16.00 | Commercial plantation for biomass energy | |
| 17.00-18.00 | Lesson learned and discussion | KUFF facilitators |
| **Day 9** | | |
| 09.00-12.00 | **Field excursion (Day 2)**<br>Native edible trees in alley farms: visit farms in central Thailand | Local Farmers, KUFF Facilitators |
| 13.00-16.00 | Local foods and products: explore products made from native edible trees | KUFF Facilitators |
| 17.00-18.00 | Lesson Learned and Discussion | KUFF Facilitators |
| **Day 10** | | |
| | **Field excursion (Day 3)**<br>Native edible trees in Northeastern Thailand | Invited speakers, KUFF facilitators |
| | Local foods and products: focus on products made from native trees | Local Farmers, KUFF Facilitators |
| | Lesson Learned and Discussion | KUFF Facilitators |
| **Day 11** | | |
| 09.00-12.00 | **Field excursion (Day 4)**<br>Agroforestry plantations with edible trees: on-site study | KUFF Facilitators |
| 13.00-18.00 | Travel back to the venue in BKK | |
| **Day 12** | | |
| 09.00-12.00 | - Integrating climate change adaptation into food security and natural resource management (Presentation preparation) | KUFF Facilitators& Participants |
| 13.00-16.30 | - Integrating climate change adaptation into food security and natural resource management (Group presentation)<br>- Course conclusion: capture feedback and wrap up the training (Secretariat)<br>- Closing Ceremony: Official end of the training program | |
| **Day 13** | Departure of participants | |

**Participant criteria**

Be nominated by their respective governments

**Education:** Bachelor's degree in Forestry, Environment, Agriculture or related field

**Language:** proficiency in English (speaking reading and writing)

**Attendance and evaluation**

Participants who complete the training will receive a certificate based on:

- Real-time class attendance (not less than 80%)
- Interactive class participation
- Presentation and report
- Evaluation

**Venue**

Faculty of Forestry, Kasetsart University, Bangkok

Forestry Research and student training station, Nakhon Ratchasima province

**Expected results**

1. The trainees understand climate change impacts on forest and its role
2. The trainees understand climate change mitigation and adaptation for forest and

natural resources management
3. The trainees can implement climate change mitigation and adaptation to manage forest and natural resources in regional international and level

## Organization/institutions

### Implementing agencies

- Forestry Research Center, Faculty of Forestry, Kasetsart University
- Forest Research and Development Office, Royal Forest Department

### Contact persons

- Dr. Sapit Diloksumpun: fforspd@ku.ac.th

## Expenditure/funding

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