

# **International Virtual Training Course on “Sustainable Waste Management in a Circular Economy”**

**Faculty of Environment and Resource Studies**

**Mahidol University, Thailand**

**November 3-22, 2022**

## **1. Course Title:**

Sustainable Waste Management in a Circular Economy

## **2. Duration**

November 3-22, 2022

## **3. Background and Rational**

Waste is a global issue. It has strong linkages to a range of other global challenges and sustainable development such as health, climate change, poverty reduction, food and resource security and sustainable production and consumption. Pollution from waste and wastewater is a major problem in the world that impacts many parts of society and the economy. The increasing in population, advanced technology, social and economic development is causing a rise of waste and wastewater. Inappropriate management of waste is an immediate solution to cope with the tremendous amount of waste generated and the consequences of it causes major problem throughout the world. The uncontrolled emission of greenhouse gases from the degradation of organic substances in waste and wastewater such as methane and carbon dioxide is one of the major concerned in global warming issue. The pollutants and toxic substances released from the illegal dumping sites can contaminate the land, groundwater and surface water nearby. Also the plastic waste in the environment can breakdown into micro plastics that can harm the aquatic lives and finally harm human health via accumulation of toxic in micro plastics through food chain.

A circular economy is an economic system aimed at minimizing waste and making the most of resources. The concept of circular economy is to keep resources in use for as long as possible, extract the maximum value from them while in use, then recover and regenerate products and materials at the end of life. This concept is in contrast to the traditional linear economy which has a 'take, make, dispose' model of production. The circular economy seems intuitive to be more sustainable than the linear economic system. Reducing the resources used, and the waste and leakage created, conserves resources and helps to reduce environmental pollution. The circular economy is an enabler for carbon emissions reduction. The potential of 3R and resource efficiency is in line with the Sufficiency Economy Philosophy (SEP), the realization of the 2030 Agenda for Sustainable Development, and the Sustainable Development Goal, SDG 12 Responsible Consumption and Production and SDG 13 Climate Action.

Waste management has been an active area of study, research and teaching of the Faculty of Environment and Resource Studies. Thailand has made large steps in improving the management in the past decade. For these reasons the Faculty of Environment and Resource

Studies intends to organize a training program in Sustainable Waste Management in a Circular Economy. This program will provide an understanding of the principles of waste management and emerging issue related to waste management and climate change. The course will rely on the expertise that the Faculty has gained through hands on research and also on the experience of Thailand over the last decade in tackling this issue. State of the art waste management and wastewater treatment techniques will be disseminated and the current challenges faced will also be debated. It is expected that this program based on practical experiences in Thailand will be of use to participants in the future.

#### **4. Objectives**

- 4.1 To introduce the concepts and principles knowledge of municipal solid waste management and treatment technologies
- 4.2 To enhance practical knowledge, technology and skills via the practice in the lab, workshop and site visits
- 4.3 To apply the concept of circular economy and sufficiency economy through waste management

#### **5. Course Contents**

##### **5.1 Course Outline**

- 1) Sustainable Waste Management Waste as Resources and Circular Economy
- 2) Industrial Waste and Hazardous Waste Management
- 3) Sufficiency Economy, 3Rs and Circular Economy
- 4) Biological Treatment of Waste (Composting)
- 5) Thermal Treatment of Waste (Gasification, Pyrolysis and Incineration) and Waste to Energy: RDF/Cement Kiln/Plastic Waste to Oil
- 6) Waste Disposal in Landfill
- 7) Plastic Waste: Its Application and Its Alternatives
- 8) Marine Debris and Micro plastics
- 9) E-Waste: Responsible Consumption and Production and E-Waste Trafficking
- 10) Overview of Wastewater Treatment/Wastewater Collection System
- 11) Central Wastewater Treatment System for Urban Area (Activated Sludge/ Oxidation Ditch/RBC)
- 12) Waste and Climate Change
- 13) Environmental Persistent Pharmaceutical Pollutants: EPPP and Wastewater Treatment
- 14) WTE: Sludge/Organic Waste Digestion in Anaerobic Process/ Biogas utilization for energy in small scale
- 15) Infectious Waste and COVID-19 Pandemic: Lesson Learned
- 16) Disaster Waste Management and Construction and Demolition Waste Management
- 17) GIS Application for Waste Management
- 18) Illegal dumping/discharge: Investigation and Remediation
- 19) Public Participation/Fee collection

## **5.2 Workshop/Practices**

- 1) Waste Management During COVID-19 Pandemic
- 2) Plastic Waste Management to Combat with Marine Pollution

Training methodologies employed during this course via online Zoom platform include following activities:

- Lecture delivered by experts
- Discussion among participants
- Presentation of case study/mini-project by participants
- Online evaluation form

## **6. Invited Countries**

The direct beneficiaries of the training are only members of the Conference on Interaction and Confidence Building Measures in Asia (CICA) comprising of Afghanistan, Azerbaijan, Bahrain, Bangladesh, Cambodia, China, Egypt, India, Iran, Iraq, Israel, Jordan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Palestine, Qatar, Russia, South Korea, Sri Lanka, Tajikistan, Thailand, Turkey, United Arab Emirates, Uzbekistan, and Vietnam

## **7. Venue**

This twenty-day online course will be conducted November 3-22, 2022 via Zoom cloud meetings from Faculty of Environment and Resource Studies, Mahidol University, Thailand

## **8. Expecting Results**

Expected key results for participants after completion of the training course:

- Basic knowledge of waste management and wastewater treatment
- Meaningful information about advanced technology for treatment, disposal and remediation processes related to waste and wastewater in Thailand and participants' countries
- Better understanding of further applications through workshop
- Information about current Laws, Regulations and Policies of waste and wastewater management in Thailand and participants' countries
- Understand the emerging issues of waste and its impacts and know how to tackle with the coming problems.

## **9. Evaluation**

- No paper examination after completing this training course
- Participant must attend the class, workshop, and presentation online for no less than 80% of total training period.

## **10. Institution**

### **10.1 Executing/Implementation Agency**

- Implementation organization:  
Faculty of Environment and Resource Studies, Mahidol University
- Staff availability:

17 Lecturers will participate in this training.

30 Supporting staff will be in charge in this training.

- Training materials:  
Hand-outs, VDO clips, electronic version of document and manual related to course topics are available.
- Equipment:  
Computers, printers, LCD, media equipment
- Other facilities:  
Phone, fax and internet access are available
- Address:  
999 Phuttamonthon 4 Rd., Salaya, Phuttamonthon, Nakhon Pathom  
73170
- Course Leader:  
Dean of Faculty of Environment and Resource Studies
- Course Director:  
Asst. Prof. Dr. Achara Ussawarujikulchai
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## 11. Expenditure and Funding

### 11.1 Sponsored by:

Thailand International Cooperation Agency (TICA) and  
The Conference on Interaction and Confidence Building Measures in Asia  
(CICA)

## 12. (Draft) Schedule

Time	Activities
<b>Day 1 - Thursday 3 November, 2022</b>	
12:00 – 13:00	<b>Opening ceremony</b> <ul style="list-style-type: none"><li>• Audio visual presentation: Thailand International Cooperation Agency (TICA) and Mahidol University</li><li>• Welcoming speech by Dean of the Faculty of Environment and Resource Studies</li><li>• Opening speech by Thailand International Cooperation Agency (TICA)</li><li>• Introduction of Participants</li><li>• Course Introduction by Asst. Prof. Dr. Achara Ussawarujikulchai</li></ul>

<b>Time</b>	<b>Topic</b>	<b>Instructor</b>
13:00 – 16:00	<b>Topic 1:</b> Sustainable Waste Management Waste as Resources and Circular Economy	
<b>Day 2 - Friday 4 November, 2022</b>		
09:00 – 12:00	<b>Topic 2:</b> Industrial Waste and Hazardous Waste Management	
13:00 – 16:00	<b>Topic 3:</b> Sufficiency Economy, 3Rs and Circular Economy	
<b>Day 3 - Saturday 5 November, 2022</b>		
<b>Day 4 - Sunday 6 November, 2022</b>		
<b>Day 5 - Monday 7 November, 2022</b>		
09:00 – 12:00	<b>Topic 4:</b> Biological Treatment of Waste (Composting)	
13:00 – 16:00	<b>Topic 5:</b> Thermal Treatment of Waste (Gasification, Pyrolysis and Incineration) and Waste to Energy: RDF/Cement Kiln/Plastic Waste to Oil	
<b>Day 6 - Tuesday 8 November, 2022</b>		
09:00 – 12:00	<b>Topic 6:</b> Waste Disposal in Landfill	
13:00 – 16:00	<b>Topic 7:</b> Plastic Waste: Its Application and Its Alternatives	
<b>Day 7 - Wednesday 9 November, 2022</b>		
<b>Day 8 - Thursday 10 November, 2022</b>		
09:00 – 12:00	<b>Topic 8:</b> Marine Debris and Microplastics	
13:00 – 16:00	<b>Topic 9:</b> E-Waste: Responsible Consumption and Production and E-Waste Trafficking	
<b>Day 9 - Friday 11 November, 2022</b>		
09:00 – 12:00	<b>Topic 10:</b> Overview of Wastewater Treatment/Wastewater Collection System	
13:00 – 16:00	<b>Topic 11:</b> Central Wastewater Treatment System for Urban Area (Activated Sludge/ Oxidation Ditch/RBC)	

<b>Day 10 - Saturday 12 November, 2022</b>		
<b>Day 11 - Sunday 13 November, 2022</b>		
<b>Day 12 - Monday 14 November, 2022</b>		
09:00 - 12:00	<b>Topic 12:</b> Waste and Climate Change	
13:00 - 16:00	<b>Topic 13:</b> Environmental Persistent Pharmaceutical Pollutants: EPPP and Wastewater Treatment	
<b>Day 13 - Tuesday 15 November, 2022</b>		
09:00 - 12:00	<b>Topic 14:</b> WTE: Sludge/Organic Waste Digestion in Anaerobic Process/ Biogas utilization for energy in small scale	
13:00 - 16:00	<b>Topic 15:</b> Infectious Waste and COVID-19 Pandemic: Lesson Learned	
<b>Day 14 - Wednesday 16 November, 2022</b>		
<b>Day 15 - Thursday 17 November, 2022</b>		
09:00 - 12:00	<b>Topic 16:</b> Disaster Waste Management and Construction and Demolition Waste Management	
13:00 - 16:00	<b>Topic 17:</b> GIS Application for Waste Management	
<b>Day 16 - Friday 18 November, 2022</b>		
09:00 - 12:00	<b>Topic 18:</b> Illegal dumping/discharge: Investigation and Remediation	
13:00 - 16:00	<b>Topic 19:</b> Public Participation/ Fee collection	
<b>Day 17 - Saturday 19 November, 2022</b>		
<b>Day 18 - Sunday 20 November, 2022</b>		
<b>Day 19 - Monday 21 November, 2022</b>		
09:00 - 12:00	<b>Workshop 1:</b> Waste Management During COVID-19 Pandemic	
13:00 - 16:00	<b>Workshop 2:</b> Plastic Waste Management to Combat with Marine Pollution	

<b>Day 20 - Tuesday 22 November, 2022</b>		
09:00 - 11:00	Overall Conclusion and Course Evaluation	
11:00 - 11:30	<b>Closing Ceremony</b> <ul style="list-style-type: none"> <li>• Closing speech by Dean of the Faculty of Environment and Resource Studies</li> <li>• Thank you Speech by the representative from all participants</li> </ul>	