

International Training Course on “Exploring the Role of Geospatial Technology with Environmental Health and Human Health: Impacts, Vulnerability and Adaptations of Climate Change”

Faculty of Environment and Resource Studies

Mahidol University, Thailand

4 - 20 November, 2025

1. Course Title

“Exploring the Role of Geospatial Technology with Environmental Health and Human Health: Impacts, Vulnerability and Adaptations of Climate Change”

2. Duration

4 - 20 November, 2025 - (17 days)

3. Background and Rational

An uncertain world environment has forced national leaders to re-assess medical support requirements. Changes in global climate, disease patterns, epidemiology, coastal zone erosion, natural disasters and complex emergency events such as COVID-19, avian flu, SARS, dengue, malaria, AIDS have emphasized the central role to be played by the healthcare community in helping to mitigate the impact of these threats. Recent advances in technology have enabled the visualization of these distributions using Geospatial Technology and have since become an indispensable tool both in research and practice in public health and environmental management. A strategy to prevent their emergence is the key to ensure safety from these deadly diseases. These diseases emerge due to various spatial factors such as climate, environment, water quality and management, education, air pollution, natural disasters, social and many others. There is a need to understand the spatial relationship and impact of these factors on the human health.

Environmental management and impact of human health have been an active area of study, research, training and teaching of the Faculty of Environment and Resource Studies. The Faculty is concerned with all stakeholders: environmentalist, scientist, epidemiologist and those involved with human health impact. For these reasons the Faculty of Environment and Resource Studies intends to organize a training program in Health and Geographic Information System. This program will provide an understanding of the principles of health related with environment, to integrate GIS tools in research of environment and public health practice. The lectures will cover the community participatory management in environmental problem and healthcare. The course will rely on the expertise that the Faculty has gained through hands on research and on the experience of Thailand over the last decade in tackling this issue. State of the art Geospatial data and technology 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 countries' participants in the future.

This training examined the extent to which health studies, mostly in public health and epidemiology, used geospatial technology. We will identify GIS as a tool for they used from geocoding through simple buffer/overlay functions to spatial query functions. Implementation within GIS of spatial analytical tools suitable for aggregated data over a region will increase the use of Geospatial technology beyond simple GIS operations and visualization in health studies. In addition, this course will also provide relevant information and experiences of the development and movement of health and geospatial technology in Thailand. The Royal Thai Government in collaboration with

the Government of Singapore responded to the emerging health crisis by undertaking radical health system reform that reflects responses to past crisis in health and geospatial visualization and analysis from last few years. Hopefully, the topic of this current issue will be useful for countries participants in the future.

4. Objectives

- 4.1 To introduce the concepts and principles of geospatial technology
- 4.2 To build capacity and develop well-educated people who have basic knowledge concerning climate change impacts on health, geospatial visualization, and environment management.
- 4.3 To share the practical knowledge and technology of disease prevention and control, Geo-Health and experience on integrating of Geospatial technology with health problem.

5. Course Contents

5.1 Course Outline

Module: Geo-information technology for environmental health and human health applications: *Climate Change, and Health Implications*

1. Understanding Geo-information technology with health application
2. Climate Change Impact on Dengue fever in Thailand using geospatial analysis
3. Geo-informatics on Environmental Issues
4. How COVID-19 pandemic effects on Air Quality and Environment
5. Potential impact of climate change on air pollution-related human health effects and adaptation
6. The role of geography to track the health situation
7. Spatial analysis for epidemiology and Public Health
8. Lessons learned how to apply LiDAR technology and GIS for Disaster and ongoing challenges for disaster vulnerability assessment
9. Geo-Informatics on Environmental Issues. The Extreme Weather Events and Health Effects
10. Urban resilience to climate extremes in Thailand
11. Spatial Distribution and Hotspot Detection
12. HNAP: National Adaptation Plan in health sector
13. Extreme Precipitation, Health Vulnerability and Adaptation
14. Integration of GIS Technology with R programming to COVID-19 pandemic
15. Implementation within GIS of spatial analytical tools for climate change impacts and vulnerability assessment/Public Health
16. Mitigation and Adaptation Plans for climate change impact

5.2 Case studies and Workshop

Case studies on health and geographic information system and breakout group for pre-proposal for integrating GIS with health research. Training methodologies to be used during this training course during 4 - 20 November, 2025 include activities:

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

5.3 Study Trip /Field Trip

Two-day field trip at GISTDA Satellite Receiver Station Chonburi Province and Air Quality Monitoring Station, Rayong Province

5.4 Advance Assignments

5.4.1 **Country Report** for disease distribution by using Geo-Information Technology:

1.1 General information of participant (1 page of A4 size paper) including; Name of participant, Educational background, Country, Name of Organization, Participant's position, Duties and responsibilities (Briefly)

1.2 Content (up to 4-5 pages of A4 size paper): The detail in your country report should cover with the following topics.

- a) The current situation on public health, epidemiology and GIS and the emphasis on application to public health, epidemiology, healthcare and environment in your country
- b) Country policy related to communication and non-communication disease control
- c) The best available technologies/ practices related to public health, epidemiology, and healthcare
- d) Lessons learned from past practices of GIS, environmental management and public health
- e) The prevention, rapid surveillance systems that used to control sites in your country
- f) The current situation on health problems, technology and its application in your country

5.4.2 **Practice and presentation for a case study of disease distribution:** participants will prepare a case study about their country including the following information:

- 1.1 National demographic data and disease cases statistics
- 1.2 GIS database
- 1.3 Discussion and presentation of case studies from their country
- 1.4 Submission date: No later than on **October 15, 2025**

6. Participants Criteria

- Age: Less than 40 years old
- Work experience in related field in Health more than 2 years.
- Education: Equivalent to Bachelor Degree or higher degree
- Language: Good command in English
- Computer literacy

7. Venue

Faculty of Environment and Resource Studies, Mahidol University

Accommodation: 1. Hotel at Salaya

2. Hotel at the field site for 1 night

8. Expected Outcomes

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

- Basic knowledge of health and geographic information system

- Meaningful information about advanced technology for mapping, assessment, monitoring and management related to epidemiology and environmental disaster in Thailand and participants' countries
- Better understanding of further applications through case study practice.

9. Evaluation

- No paper examination after completing this training
- Participant must attend the class, workshop, and presentation 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:**
15 Lecturers will involve in this training.
30 Supporting staff/general assistants will be in charge in this training.
- **Training material:**
Handouts and other documents related to course topics will be given/ available to trainees.
- **Equipment:**
GIS software, R programme, Computers, printers, LCD, media equipment and laboratory equipment are available
- **Other facilities:**
Phone, fax and internet access are available
- **Address:**
Faculty of Environment and Resource Studies, Mahidol University
999 Phuttamonthon 4 Rd., Salaya, Phuttamonthon,
Nakhon Pathom 73170, Thailand
- **Course Leader:**
Dean of Faculty of Environment and Resource Studies
- **Course Director:**
Associate Professor Dr.Kanchana Nakhapakorn
- **Contact Person:**
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11. Expenditure and Funding

11.1 Sponsored by:

Thailand International Cooperation Agency (TICA)

11.2 Estimated Cost: Operational cost only

Number of trainees: 20 persons

Course duration excluding arrival and departure days 17 days

12 Schedule

Tuesday 4 November, 2025		
09:00 – 10:00	Registration	
10:00 – 11:00	Opening ceremony	
	<ul style="list-style-type: none"> ☒ Audio visual presentation: Thailand International Cooperation Agency (TICA) and Mahidol University ☒ Welcoming speech by Dean of the Faculty of Environment and Resource Studies ☒ Opening speech by Thailand International Cooperation Agency (TICA) ☒ Introduction of Participants ☒ Course Introduction by Assoc.Prof.Dr.Kanchana Nakhapakorn 	
11:00 – 12:00	Salaya campus tour and open house	
12:00 – 13:00	Lunch	
Time	Topic	Instructor
13:00 - 16:00	Topic 1: Understanding Geo-information technology with health application	Faculty of Environment and Resource Studies, Mahidol University
	Topic 2: Climate Change Impact on Dengue fever in Thailand using geospatial analysis	
16:30 – 18:30	Welcoming Dinner	
Wednesday 5 November, 2025		
09:00 - 12:00	Topic 3: Geo-informatics on Environmental Issues <ul style="list-style-type: none"> - VOCs - PM2.5 	Pollution Control Department
12:00 – 13:00	Lunch	
13:00 - 16:00	Topic 4: How COVID-19 pandemic effects on Air Quality and Environment	Silpakorn University
Thursday 6 November, 2025		
09:00 – 12:00	Country Report Presentation 1	All Lecturers
12:00 – 13:00	Lunch	
Thursday 6 November, 2025 (Cont.)		
Time	Topic	Instructor

13:00 – 16:00	Country Report Presentation 2	All Lecturers
Friday 7 November, 2025		
09:00 - 12:00	Topic 5: Potential impact of climate change on air pollution-related human health effects and adaptation	Faculty of Tropical Medicine, Mahidol University
12:00 – 13:00	Lunch	
13:00 - 16:00	Topic 6: The role of geography to track the health situation	Srinakharinwirot University
Saturday 8 November, 2025		
<i>Social and cultural activities: Rattanakosin Island - Bangkok</i>		
Sunday 9 November, 2025		
<i>Social and cultural activities: 1) Chatuchak Weekend Market 2) Samyan Mitrtown - Bangkok</i>		
Monday 10 November, 2025		
09:00 - 12:00	Topic 7: Spatial analysis for epidemiology and Public Health - Using GIS informatics in Biomedical Research and Public Health	Faculty of Tropical Medicine, Mahidol University
12:00 – 13:00	Lunch	
13:00 - 16:00	Topic 8: Lessons learned how to apply LiDAR technology and GIS for Disaster and ongoing challenges for disaster vulnerability assessment	Chulalongkorn University GIS Co.Ltd.
11-12 November, 2025		
07:00 – 16:00	Field trip 1: Two-day field trip at 1) GISTDA Satellite Receiver Station Chonburi Province 2) Air Quality Monitoring Station, Rayong Province	Instructors and Staff
Thursday 13 November, 2025		
09:00 - 12:00	Topic 9: Geo-Informatics on Environmental Issues. The Extreme Weather Events and Health Effects - Environment health - Drought - PM2.5	Geo-Informatics and Space Technology Development Agency (Public Organization): GISTDA

12:00 - 13:00	Lunch
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Thursday 13 November, 2025 (Cont.)

Time	Topic	Instructor
13:00 - 16:00	Topic 10: Urban resilience to climate extremes in Thailand	Thammasat University

Friday 14 November, 2025

09:00 - 12:00	Topic 11: Spatial Distribution and Hotspot Detection	Geographic Information Science, ICT, University of Phayao
12:00 - 13:00	Lunch	
13:00 - 16:00	Topic 12: HNAP: National Adaptation Plan in health sector	Ministry of Public Health

Saturday 15 November, 2025

Social and Cultural Activities: MBK/ Pratunam/ Platinum Fashion Mall - Bangkok

Sunday 16 November, 2025

Social and Cultural Activities: 1) Ayutthaya Elephant Palace & Royal Kraal 2) Wat Mahathat - Phra Nakhon Si Ayutthaya province

Monday 17 November, 2025

09:00 - 12:00	Topic 13: Extreme Precipitation, Health Vulnerability and Adaptation	Hydro-Informatics Institute (Public Organization) (HII)
12:00 - 13:00	Lunch	
13:00 - 16:00	Topic 14: Integration of GIS Technology with R programming to COVID-19 pandemic	Thammasat University

Tuesday 18 November, 2025

09:00 - 12:00	Topic 15: Implementation within GIS of spatial analytical tools for climate change impacts and vulnerability assessment/Public Health <ul style="list-style-type: none"> - Buffer - Query - Overlay functions - Map layout 	Faculty of Environment and Resource Studies, Mahidol University
12:00 - 13:00	Lunch	
13:00 - 16:00	Topic 16: Mitigation and Adaptation Plans for climate change impact	Environmental Research and Training Center,

		Ministry of Natural Resources and Environment
Wednesday 19 November, 2025		
Time	Topic	Instructor
09:00 - 12:00	Workshop 1: Individual/Group mini-project assignment	Assoc.Prof.Dr. Kanchana Nakhapakorn -GIS for the Beginners -Install R and R-Studio
12:00 - 13:00	Lunch	
13:00 - 16:00	Workshop 2: Mini-project discussion	Assoc.Prof.Dr. Kanchana Nakhapakorn -GIS for the Beginners -Install R and R-Studio
Thursday 20 November, 2025		
09:00 - 12:00	Workshop 3: Mini-project presentation	All lecturers
12:00 - 13:00	Lunch	
13:00 - 14:00	Course discussion and overall conclusion	All lecturers and staff
14:00 - 15:00	Closing Ceremony <ul style="list-style-type: none"> ☒ Report by Assoc.Prof.Dr.Kanchana Nakhapakorn, Course Director, Faculty of Environment and Resource Studies ☒ Speech by Director of Thailand International Cooperation Agency (TICA) ☒ Certificate presentation and closing speech by the President of Mahidol University ☒ Group photo 	

*** Please note that the schedule is subject to change.**