

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

**Faculty of Environment and Resource Studies**

**Mahidol University, Thailand**

**8 – 19 November 2021**

**1. Course Title**

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

**2. Duration**

8 – 19 November 2021

**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 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 through the use of Geographic Information Systems (GIS) 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 also on the experience of Thailand over the last decade in tackling this issue. State of the art GIS 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 countries' participants in the future.

This training examined the extent to which health studies, mostly in public health and epidemiology, used geographical information systems (GIS). 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 GIS beyond simple GIS operations in health studies. In addition, this course will also provide relevant information and experiences of the development and movement of health and

GIS system 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 GIS 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 geo-information technology
- 4.2 To build capacity and develop well-educated people who have basic knowledge concerning climate change impacts on health, GIS and control and environment management.
- 4.3 To share the practical knowledge and technology of disease prevention and control, Geo-Health and experience on integrating of GIS 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. Overview of Geo-informatics understanding Geo-information technology with health application
2. Geo-informatics and health applications climate change impact on dengue fever in Thailand using spatial 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. COVID-19 situation in Thailand
7. Lessons learned from land slide and ongoing challenges for disaster vulnerability assessment using LiDAR
8. Spatial analysis for epidemiology and public health
9. Geo-Informatics on environmental issues. The extreme weather events and health effects
10. Climate change impacts and health: GIS and spatial modeling
11. Geo-informatics on environmental issues
12. Extreme precipitation, health vulnerability and adaptation
13. Mitigation and adaptation plans for climate change impact on human health
14. Integration of GIS technology with R programme to COVID-19 pandemic
15. Implementation within GIS of spatial analytical tools for climate change impacts and vulnerability assessment /public health

##### 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 by online Zoom platform during 8-19 November 2021 include activities:

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

### **5.3 Advance Assignments**

#### **5.3.1 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

**5.3.2 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 GIS software and R programme
- 1.4 Online participation, discussion and presentation of case studies from their country.

### **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
- Able to participate in the online training course for the entire duration

### **7. Venue**

This ten-day online course will be conducted November 8-19, 2021 via Zoom cloud meetings from Faculty of Environment and Resource Studies, Mahidol University, Thailand

### **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, VDO clip and other pdf 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:**  
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999 Phuttamonthon 4 Rd., Salaya, Phuttamonthon,  
Nakhon Pathom 73170, Thailand
- **Course Leader:**  
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