

Training Workshop Proposal

Theme: Public Health

1. Course Title: Dengue and Zika Prevention Campaign
2. Duration: 3 Weeks
3. Background and Rational

Among the most significant anticipated health impacts of climate change is an increase in the incidence of mosquito-borne infectious disease, including dengue fever and Zika incidences. The occurrence of disease, like dengue fever and Zika incidences is typical of the complex interaction between climate, environment and man at the origin of epidemic. In the last 50 years, there has been a thirtyfold increase in the amount of incidences as well as geographical expansion of incidences to new countries, particularly in rapidly expanding urban and semi-urban areas in middle and low income countries where water storage and waste disposal services are limited. An estimated 50 million dengue infections occur annually and about 2,500 million people live in regions with the potential risk of dengue transmission, especially developing countries.

Concerns regarding the impact of global warming on vector-borne diseases, have intensified the interest in the relationship between temperature and dengue fever and Zika incidences. They have also led to research so as to determine whether climatic factors alone can be used to indicate or predict variations in dengue and Zika incidences. Epidemiological surveys show that in endemic situations trends in incidence are generally driven by variations in seasonal climate. However, such changes depend on many climatic parameters, whereas the impact of temperature alone cannot be isolated easily from that of other climatic (e.g. rainfall, relative humidity) factors.

Global climate change poses the threat of serious social upheaval, population displacement, economic hardships, and environmental degradation. Human health could be influenced by increased variability and lasting changes in temperature, rainfall patterns, storm severity, frequency of flooding or droughts and rising sea levels. The ecology, development, behavior and survival of mosquitoes and the transmission dynamics of the diseases they transmit are strongly influenced by climatic factors (i.e. precipitation, temperature, relative humidity, wind, duration of daylight, storm severity, frequency of flooding or droughts and rising sea levels). Changes in temperature, rainfall and relative humidity have the potential to enhance vector development, reproductive and biting rates, shorten pathogen incubation period and encourage adult longevity. In addition, changes in wind direction, velocity and frequency will have an impact on adult mosquito populations, affecting dispersal, survival and

aspects of the general behavior of many species. The complex interplay of all these factors determines the overall effect of climate on the local prevalence of mosquito-borne diseases.

Pathogens spread by mosquitoes kill more than a million people a year across the world, mostly in developing countries in tropical regions. Increasing temperature and rainfall potentially provide suitable conditions and habitats for mosquito spreading pathogens; however, climate alone is not the only cause for the spreading. The mosquito has already hitchhiked to Europe and North America with eggs attached to used tires and lucky bamboo. As a matter of fact, the movement of people, not variations in climate is the biggest risk.

Surveillance is a critical component of any dengue and Zika prevention and control programme because it provides the information necessary for risk assessment and programme guidance, including epidemic response and programme evaluation. This workshop will focus on training and pushing the communities in developing countries to be the driving forces of dengue and Zika control and prevention in their own countries. In this workshop, participants will be trained to utilize the GLOBE Observer App: Mosquito Habitat Mapper (MHM) App to collect mosquito larvae observations in their countries. This MHM App is freely available and easy to install on any smart phones. This App allows participants identify disease-carrying mosquitoes, eliminate their breeding sites, and prevent future dengue and Zika outbreaks. Their mosquito data can be visualized real-time online with an overlaid mapping function of other relevant parameters such as GPS location of mosquito breeding sites, the amount of rainfall, air temperature and relative humidity. These real-time visualization system would help participants to fully understand when and where their dengue and Zika control and prevention should take place. Participants encourage to build networks with public health officials to better control mosquitoes and reduce mosquito-borne infectious disease in their countries.

To achieve the ambitions of dengue and Zika control and prevention in developing countries, we need a vibrant, technology-oriented and dynamic workshop. We are the part of chief scientists leading the GLOBE mosquito protocol and have been testing and implementing the GLOBE mosquito protocol in Thailand for over 15 years. Walailak University will provide challenges to community leaders, NGO, and educators in developing countries where mosquitoes are primary vectors for several vector borne diseases. We will use of inquiry based learning, research based approach and hand-on workshop that will stimulate and inspire everyone to practice. Understanding the actual impacts of climate change in mosquito borne diseases is critical for purposes of sustainability and moving in the right direction.

Under the Center of Excellence for Ecoinformatics, School of Science, Walailak University, we have more than 15 years of experience implementing GLOBE atmosphere protocols (i.e. air temperature, relative humidity, rainfall, rain pH, cloud types and cloud cover), hydrology

protocol (i.e. water temperature, pH, transparency, conductivity, and salinity) and GLOBE Mosquito Habitat Mapper App. We are experts on utilized weather, hydrology, and mosquito data for dengue and Zika control and prevention and frequently do training for schools and communities in various countries e.g. the US. and southeast Asia and Pacific region (Thailand, Vietnam, Palua, and New Zealand). Training in dengue and Zika prevention campaign using the GLOBE Mosquito Habitat Mapper App at Walailak University will create awareness, provide knowledge and management skills, disseminate and replicate best practices on mosquito control and mitigation approaches for reducing dengue and Zika risk areas and improve the quality of living in developing countries.

4. Objectives

- 4.1 To strengthen the dengue and Zika prevention training programmes to be responsive to the climate change challenges and sustainable development
- 4.2. To build critical surveillences who will promote/practice of dengue and Zika prevention in developing countries.
- 4.3 To monitor trends in the distribution, spread and environmental risk factors of dengue and Zika over time and geographically

5. Course Contents

5.1 Course Outline

Day	Key concepts/activities
1 (Lecture 3 hrs)	Open ceremony with a special talk by Prof. Dr. Sombat Thamrongthanyawong, the President of Walailak University on “Dengue and Zika Free Countries, Hope and Possible Actions” Participants present their country reports on the dengue and Zika incidences and prevention in their country.
2 (Lecture 3 hrs)	Overview on dengue and Zika symptoms. Why is dengue and Zika spreading?
3 (Lecture 3 hrs)	Impact of climate change on dengue and Zika incidences
4 (Lecture 3 hrs)	GLOBE Mosquito Habitat Mapper App training Mosquito Life cycle Mosquito larval identification Mosquito Habitat Mapper App
5 (Lecture 3 hrs)	Data collection on GLOBE Mosquito Habitat Mapper App in the field Laboratory works for mosquito larval identification
6 (Lecture 3 hrs)	GLOBE atmosphere protocol training Air Temperature, Relative Humidity, Rainfall, Rainy Days, Rain pH, Cloud types, percentage of Cloud Cover
7 (Lecture 3 hrs)	GLOBE atmosphere visualization. Data interpretation on mosquito, atmosphere and climate changes
8 (Lecture 3 hrs)	GLOBE Hydrology Protocol Water pH, temperature, transparency, conductivity, salinity
9 (Lecture 3 hrs)	Collecting hydrology protocol at Ban Laem Home Stay. Get on the long tailed boat to visit mangrove forest and collecting some water samples and measurements.
10	GLOBE hydrology visualization. Data interpretation on mosquito,

(Lecture 3 hrs)	hydrology and climate changes
11 (Lecture 3 hrs)	How to do dengue and Zika prevention campaign on social media using vdo clips.
12 (Lecture 3 hrs)	Hand-on vdo clip workshop and presentation. Participants require to produce a short vdo clip and present their clips.
13 (Lecture 3 hrs)	Capacity development for dengue and Zika prevention campaign. How to reduce the dengue an Zika burden in your country
14 (Workshop 3 hrs)	Participants write a project proposal on the knowledge of dengue and Zika prevention, GLOBE atmosphere, hydrology and Mosquito Habitat Mapper App and producing vdo from the workshop and show how to implementation dengue and Zika prevention campaign in your country.
15 (workshop 3 hrs)	Participants present dengue and Zika prevention campaign project. Each participant will have 15 min oral presentation with 15 min for questions and answers. Closing celemony

5.2 Practices

The course contains lectures, exercises, study visits and group work. Oral and written presentation of a project is included.

5.3 Study Trips/Field Trips

1. Banleam Home Stay

Day	Field trips/location/date/objectives
Day 9	Location: Ban Laem Home Stay, Thasala, Nakhon Si Thammarat. the long tailed boat to visit mangrove forest and collecting some water samples and measurements. Date: Day 9 of the workshop Objectives: to practice hydrology protocols and measurements in the natural setting.

5.4 Advance Assignments

5.4.1 Country Report

5.4.1.1 Participants are required to submit a country report together with an Application Form and present a country report during the workshop.

5.4.1.2 Country report should include these followings

Topics: general information of the country, historical background of the dengue and Zika incidences of the country, existing control and prevention concerning the dengue and Zika outbreaks, existing problems in the applicants' section, future program/project on the dengue and Zika prevention, and expectation for the training course.

Materials: statistical data/data/figures are required where it is applicable.

Length: 3-5 A4 pages, Times News Roman font 12 points, single space

Dateline: submit a country report form together with an Application Form 2 months before the workshop starts.

Country Report Form: see appendix A

5.4.2 Reading Assignment

Barreto, M. L., and Teixeira, M. G. 2008. Dengue fever: a call for local, national, and international action. *Lancet*, 372: 205.

Chumsri, A., Tina, F. W., Jaroensutasinee, M., & Jaroensutasinee, K. 2018. Seasons and socio-cultural practices affecting *Aedes* mosquito larvae in southern Thailand. *Tropical Biomedicine*, 35(1): 1-15.

Gubler, D. J. 2011. Prevention and control of *Aedes aegypti*-borne disease: lesson learned from past successes and failures. *Asia Pacific Journal of Molecular Biology and Biotechnology*, 19: 111-114.

Gubler, D. J., and Meltzer, M. I. 1999. Impact of dengue/dengue hemorrhagic fever on the developing world. *Advances in Virus Research*, 53: 35-70.

WHO. (2012). Handbook for integrated vector management. Geneva, World Health Organization.

Wongkoon, S., Jaroensutasinee, M., and Jaroensutasinee, K. 2013. Weather factors influencing the occurrence of dengue fever in Nakhon Si Thammarat, Thailand. *Tropical Biomedicine*, 30(4), 631-641.

Wongkoon, S., Jaroensutasinee, M., and Jaroensutasinee, K. 2016. Spatio-temporal climate-based model of dengue infection in southern, Thailand. *Tropical Biomedicine*, 33(1): 55-70.

5.4.3 Project Assignment

Day	Project Assignment
13-14	<p>Writing on a project assignment</p> <p>Participants write a project proposal on the knowledge of dengue and Zika prevention, GLOBE atmosphere, hydrology and Mosquito Habitat Mapper App and producing vdo from the workshop and show how to implementation dengue and Zika prevention campaign in your country.</p> <p>Date: Day 14 of the workshop.</p> <p>Documents: will be provided and can be downloaded in the google drive.</p>
15	<p>Project assignment presentation</p> <p>Participants present dengue and Zika prevention campaign project.</p> <p>Date: Day 15 of the workshop. Each participant will have 15 min oral presentation with 15 min for questions and answers.</p> <p>Closing ceremony and Farewell Party at Walailak Park</p>

5.4.4 Others

Participants should have a computer notebook and information that is relevant to dengue and Zika prevention project in your country.

6. Participant Criteria

Walailak University is expected to have a various and flexible participants from all developing countries around the globe who are interested in training on dengue and Zika prevention campaign. The course provides clear, concise and up-to-date information for anybody interested in obtaining a general understanding about dengue and Zika prevention campaign. The course should be of particular interest to the following audiences: Civil servants in health department, provincial departments and local health authorities; Health managers in private sector and civil society organizations; Faculty, researchers and students; NGO and Interested citizens.

7. Venue

Workshop location: Walailak University, Nakhon Si Thammarat, Thailand

8. Expected Results

The workshop should enable trainees to:

- 8.1 Demonstrate an in-depth understanding of dengue and Zika control and prevention

- 8.2 Promote technical skills for an improving community participation and mobilization for sustained vector control.
- 8.3 Conduct cutting edge dengue and Zika prevention campaign and/or activities in their countries
- 8.4 Promote social innovations and practices for dengue and Zika prevention campaign in their countries

9. Evaluation

The type of assessment to be used will involve continuous and summative assessment. The Assessment tools include some of the following: projects, assignments, theoretical exams, practicals field trials, using the science laboratory and computer labs, field attachment and Participatory assessment e.g. presentation to stakeholders farmers /students.

10. Institution

10.1 Executive/Implementing Agency

10.1.1 Implementing Agency

School of Science, Walailak University
 222 Thasala, Nakhon Si Thammarat 80161 Thailand
 Tel: +66-075-672005-6, Fax: +66-075-672004

10.1.2 Present Facilities

1. Staff

School of Science, Walailak University has 52 faculty members with more than 90% PhD. degree and 17 academic staff to organize this workshop as lectures and supporting staff. In addition, we also invite 2 members from the GLOBE Program to join as trainers.

2. Training Materials/Equipment Availability

Walailak University has a modern centralized laboratory and equipments, workshop participants will be trained in the modern laboratory and plenty of equipments required by the workshop.

10.2 Collaborative Organization

10.2.1 Name of organization

- 1. School of Science, Walailak University
- 2. The GLOBE Program, USA

10.2.2 Address/Contact Information/Web Site

- 1. Assoc. Prof. Dr. Krisanadej Jaroensutasinee (GLOBE Mosquito Lead scientist and GLOBE atmosphere master trainer)
 School of Science, Walailak University, email: krisanadej@gmail.com

(2) Assoc. Prof. Dr. Mullica Jaroensutasinee (GLOBE Mosquito Lead scientist and GLOBE hydrology master trainer)

School of Science, Walailak University, email: mullica.jn@gmail.com

(3) Dr. Tony Murphy

GLOBE Director, email: tmurphy@globe.gov

11. Expenditure/Funding

241,450.00 Baht (see the form for detail)

Appendix A: Country Report Form

Country report should be submitted together with the Application Form in complying the following items.

I. Introduction

1. Name of the Training Course:.....
2. Name of applicant:
- Home Address:
- Phone No. (Home & Office):
- Fax:Email:
3. Name of Country:
4. Name of Organization:
5. Main Tasks of the Organization & Organization Chart
6. Applications' Position: Roles and Responsibilities

II. General Information of the country (1-2 pages of A4 size paper):

III. Historical Background of the Subject Related to the Training Course (within 1 page of A4 size paper)

IV. Existing Laws and Regulations concerning the subject (if any)

V. Existing Problems in the Applicants' section (1-2 pages of A4 size paper)

1. Current problems and/or constraints you are facing (please describe concrete details).
2. Obstacles in the process of solving those problems.
3. Countermeasures of questions for those problems or any idea which you would like to study or solve through the course.

VI. Future Program/Project on the Related Subject

1. What is the future policy/program/or project concerning with the subject.
2. How the training course is related with those future.

VII. Expectations for the Training Course (up to 1 page of A4 size paper)

1. Main interest subject areas or topics in this training course and reasons why you pick up them.
2. How do you expect to apply the knowledge and skills received from this training course after you return to your home country.
3. Other matters you are expecting for this course (if any) (Basically this training program is fixed and cannot be changed upon your request).