



Summary of the
TRAINING COURSE ON

CLIMATE CHANGE
& HEALTH
ADAPTATION
FROM CLIMATE CHANGE

17 - 20
MARCH **2025**

Department of Health, Ministry of Public Health Thailand
Supported by the Thailand International Cooperation Agency (TICA)

SUMMARY OF THE TRAINING COURSE
ON CLIMATE CHANGE & HEALTH
ADAPTATION FROM CLIMATE CHANGE
17-20 MARCH 2025



Executive summary

The Department of Health (DOH), Ministry of Public Health (MOPH), Thailand, in collaboration with the Association of Southeast Asian Nations (ASEAN) and with the financial support of the Thailand International Cooperation Agency (TICA), convened the “Training Course on Climate Change and Health Adaptation from Climate Change” from 17 to 20 March 2025. The course was delivered in a hybrid format, with in-person sessions held at the Novotel Future Park Rangsit Hotel, Pathum Thani, Thailand, and simultaneous online participation via video conference.

The primary objective of the training was to strengthen the technical capacity of public health and environmental professionals from ASEAN Member States and other participating countries to address the health impacts of climate change. Additional objectives included facilitating the exchange of best practices in health adaptation measures and fostering a regional network for sustained collaboration on climate change and health initiatives.

A total of 65 participants from 13 countries engaged in the training. This included 23 onsite participants from Malaysia, Indonesia, the Philippines, Sri Lanka, Jordan, Egypt, Bhutan, Armenia, Liberia, and Thailand, as well as 42 online participants from the Philippines, Singapore, Cambodia, Brunei Darussalam, and Thailand, encompassing representatives from academic institutions, environment and public health agencies.

The training programme comprised three core components:

- 1. Technical lectures**, providing an overview of climate change and health linkages, national and regional plans and policies, the health risks associated with climate change, risk communication strategies, and methodologies for developing health adaptation plans.
- 2. Interactive group activities**, including the development of “Impact Chains” to elucidate causal linkages between climate factors and health outcomes, and the sharing of adaptation policies and management experiences among participants.
- 3. A field visit** to Thonburi Thawiwatthana Hospital in Bangkok to observe climate-resilient healthcare practices, with a focus on carbon footprint reduction, sustainable waste management and disaster preparedness planning.

This report consolidates the key outcomes and lessons learned from the training course. It is intended for dissemination among ASEAN Member States and relevant stakeholders, and aims to serve as a guiding reference for advancing climate change and health adaptation efforts across the region.



Acknowledgements

The Department of Health (DOH), Ministry of Public Health (MOPH), Thailand, would like to express our sincere gratitude to all organizations and individuals who contributed to the successful implementation of the training course on “Climate Change and Health Adaptation from Climate Change” held from March 17 to 20, 2025.

We would like to thank the Thailand International Cooperation Agency (TICA) for their generous financial support, and the Association of Southeast Asian Nations (ASEAN) for their valuable collaboration throughout the planning and execution of this training.

Special appreciation is extended to the expert speakers from the World Health Organization South-East Asia Regional Office (WHO SEARO), the Department of Climate Change and Environment, Mahidol University, Chulalongkorn University, and Chiang Mai University, whose knowledge and experience greatly enriched the training content.

We are also grateful to the 65 participants from 13 countries who actively engaged in the training, both onsite and online. Their enthusiasm and contributions to knowledge sharing and group discussions significantly enhanced the learning experience and strengthened regional collaboration.

Lastly, we thank the organizing team and all supporting staff for their hard work and dedication in facilitating the event both onsite at the Novotel FuturePark Rangsit Hotel and online, ensuring a smooth and effective training experience.



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The Opening Remarks



Dr. Thiti Sawaengtham,
Deputy Director-General,
Department of Health,
Ministry of Public Health
of Thailand



Good morning,

Faustina Gomez of World Health Organization South-East Asia Region,
Mr. Grisada Phakakarn of the Thailand International Cooperation Agency,
Mrs. Rosalind Amornpitakpun of Department of Climate Change and Environment,
Associate Professor Dr. Kraichat Tantrakarnapa of Mahidol University,
ASEAN Secretariat, Distinguished speakers, honorable guests, and participants.

It is a great pleasure for me to be here at this important **Training Course on Climate Change and Health Adaptation from Climate Change.**

Climate change is a global crisis that demands urgent attention, as we are already experiencing the devastating impacts of more frequent and intense natural disasters, such as storms and floods, as well as unpredictable weather patterns. These events have impacts on public health, leading to increased illness and mortality.

The World Health Organization estimates that between 2030 and 2050, climate change will cause approximately 250,000 additional deaths per year from malnutrition, malaria, diarrhea, and heat stress. These impacts are projected to worsen in the future, posing a significant threat to our region.

The Ministry of Public Health, through the Department of Health, is committed to protecting the health of our people from the impacts of climate change. Our focus is on building capacity among health professionals, strengthening their knowledge and skills to effectively prevent and respond to climate-related health risks.

The Department of Health, with a funding support from the Thailand International Cooperation Agency, recognizes the importance of capacity building and has organized this training with collaborative effort. I believe that this training will provide a valuable platform for participants to share experiences, learn from experts, and strengthen capacity to protect the health of their populations from Climate Change.

I am honored to have participants both onsite and virtually via video conference. Onsite participants include representatives from Malaysia, Indonesia, the Philippines, Sri Lanka, Jordan, the Arab Republic of Egypt, the Kingdom of Bhutan, the Republic of Armenia, and the Republic of Liberia. Additionally, representatives from ASEAN Member States are joining us virtually for this important training.

I would like to express my sincere gratitude to the Director-General of the Thailand International Cooperation Agency, ASEAN Secretariat, and all the distinguished speakers for their support and participation in this training.

I am confident that this training will be successful in achieving its objectives and provide great benefits to everyone here.

Thank you.



The Opening Remarks



Mr. Grisada Phakakarn,
Director of Human Resources
Development Cooperation Division,
Thailand International Cooperation
Agency,
Ministry of Foreign Affairs
of Thailand



Dr. Thiti Sawaengtham, Deputy Director-General,
Department of Health
Distinguished Guests and Participants,

On behalf of the Thailand International Cooperation Agency (TICA), Ministry of Foreign Affairs of Thailand, it is my great pleasure to welcome all of you to the Annual International Training Course (AITC) on Climate Change and Health Adaptation. I would like to extend a warm welcome to all participants from 9 countries, and thanks for your journey from Armenia, Bhutan, Egypt, Indonesia, Jordan, Liberia, Malaysia, the Philippines, and Sri Lanka. This course provides a vital platform for collaboration and knowledge-sharing as we work together to address the significant of the global health challenges posed by climate change.

Ladies and Gentlemen,

Climate change is no longer a distant threat, it is a present reality, affecting the health and well-being of communities worldwide. Rising temperatures, global boiling, and environmental changes have led to increased health risks, ranging from heat-related illnesses to the spread of vector-borne diseases and food unsafe and insecurity. Recognizing these global issues, TICA, in collaboration with the Health Impact Assessment Division, Department of Health, Ministry of Public Health of Thailand, has arranged this course to strengthen capacity in climate change and health adaptation.

Throughout this four-day program, participants will gain in-depth knowledge on key topics, including health risk assessments, policy frameworks, and adaptation strategies. Experts will provide insights into effective health adaptation plans, risk communication, and sustainable healthcare solutions. Additionally, this course encourages interactive discussions, case studies,

and collaboration to ensure that participants must leave with practical and applicable knowledge to their respective countries.

Beyond the academic exchange, this course serves as a platform for fostering international cooperation. I do hope that this programme will provide you memories and meaningful connections that extend well after the course. Your participation and contribution will craft a strong network of public health personnel to mitigate climate-related health risks. Your engagement, ideas, and effort will be instrumental in shaping a healthier, more climate-resilient future. TICA and MoH encourage you to actively participate, exchange knowledge, and apply what you learn to make a tangible impact in your countries and to be a better world.

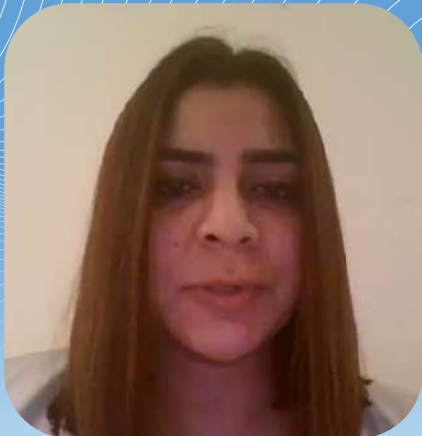
To ensure that this network continues beyond the training, I encourage you to stay connected through our TICA Fellowship and Alumni Facebook page and visit our website. There, you will find updates on upcoming courses, as well as other TICA activities and opportunities for further collaboration.

Before I end my remarks, I would like to express my sincere gratitude to the Department of Health, our expert speakers, and everyone involved in organizing this course. Have a pleasant stay.

Thank you.



Module 1:



Overview of Climate Change and Health

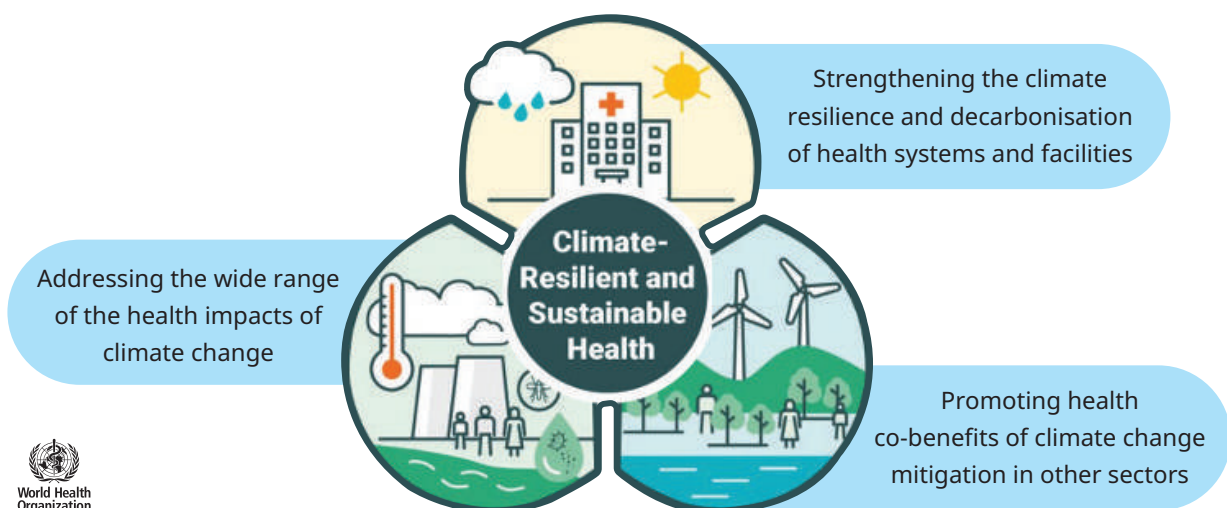
Dr. Faustina Gomez,
Regional Focal for Climate Change,
World Health Organization South-East Asia
Region (WHO-SEARO)



The World Health Organization (WHO) highlights three strategic areas to address the health risks posed by climate change and to advance the development of **climate-resilient and low-carbon health systems**:

- 1) Addressing the wide range of health impacts of climate change
- 2) Promoting the health co-benefits of climate change mitigation in other sectors
- 3) Strengthening the climate resilience and decarbonization of health systems and facilities

Focus areas for climate change and health



To support this effort, the COP26 Health Program, particularly the Alliance for Transformative Action on Climate and Health (ATACH), was established with the objective of enabling countries to make and fulfill ambitious commitments toward sustainable health systems through collective action.



Assessing Health Impacts and Co-benefits

Key processes in addressing climate change and health (CCH) include:

- Health vulnerability and adaptation assessments (V&A)
- Greenhouse gas (GHG) emission assessments
- Evaluations of health co-benefits

These processes are integrated within national climate planning instruments such as the National Adaptation Plans (NAPs) and the Long-Term Low Emission Development Strategies (LT-LEDS). The Health National Adaptation Plan (HNAP) plays a crucial role in ensuring that health concerns are prioritized and in mobilizing necessary financial resources.

Features of an HNAP

A Health National Adaptation Plan (HNAP) integrates climate adaptation into national health planning, implementation processes, and monitoring systems. It is a nationally led initiative, owned and driven by individual countries, and is grounded in the best available scientific evidence. The HNAP ensures that health considerations are systematically embedded within the broader National Adaptation Plan (NAP) framework. Moreover, it offers flexibility, allowing it to be adapted to diverse country contexts and varying capacities.

Quality Criteria and Implementation (Case Studies)

1. Laying the Groundwork – Nepal Case Study

- Aligning with the NAP process
- Utilizing available information and evidence to identify gaps
- Addressing capacity limitations and policy alignment



2. Preparatory Elements – Ethiopia Case Study

- Conducting V&A assessments
- Developing national strategies and priority action plans
- Applying the WHO Operational Framework for climate-resilient health systems
- Key considerations include:
 - Current morbidity and mortality
 - Projected future health impacts
 - Effectiveness of current policies
 - Identification and prioritization of adaptation options using multiple assessment approaches (e.g., benefit-risk, multi-criteria)

3. Implementation Strategies – Montenegro Case Study

- Health adaptation through targeted policies, projects, and programs
- Coordination across national development priorities and sectors influencing health
- Mobilizing financial resources, addressing gaps through donor support and external funding

4. Monitoring and Review – Tanzania Case Study

- Strengthening systems for monitoring health vulnerability and resilience
- Integrating climate and health indicators across sectors
- Periodically updating the HNAP in alignment with the NAP

Building and Financing Climate-Resilient Health Systems

Efforts to build and finance climate-resilient health systems involve strategic investment in the development of health systems that are both climate-resilient and low in carbon emissions. Effective allocation of climate finance is essential; currently, approximately 29% of climate-related funding is directed toward health-related actions and adaptation plans. To ensure accountability and guide future efforts, progress should be regularly monitored using tools such as the WHO Health and Climate Change Global Survey and the UNFCCC country profiles.



Promoting Health Co-Benefits Across Sectors

WHO emphasizes that health benefits derived from climate action in non-health sectors such as energy, transport, and agriculture must be recognized and leveraged to enhance overall societal wellbeing and sustainability.

Module 2:



Policy on Climate Change and the Implementation of Health Adaptation Plans

Mrs. Rosalind Amornpitakpun,
Climate Change Adaptation Division,
Department of Climate Change and Environment,
Ministry of Natural Resources and
Environment of Thailand



The impacts of climate change due to rising global temperatures include drought, flooding, rising sea levels, and consequences for both plant and animal life. Each increase in temperature affects ecosystems and human health. The information from the global risk impacts in 2024 found that the top global risk is extreme weather events. Thailand is in the top 20 countries most affected by global warming

The history of Thailand's participation in UNFCCC and related treaties (Kyoto Protocol, Paris Agreement) that Thailand pledged to UNFCCC in 1994 and entered into force in 1995, ratified in KP and PA in 2005 and 2016, respectively.

Climate change policies and plans

Thailand has integrated climate change in every level of policies and plans including

1. Climate Change Master Plan (2015-2050)

Thailand has Climate Change Master Plan (2015-2050) with a vision on “Thailand is resilience to the impacts of climate change”

Thailand's Climate Change Master Plan 2015-2050

Vision 2050 • Thailand is resilient to the impacts of climate change.

- Agriculture and Food Security
- Natural Resource
- Human Health
- Tourism
- Human Settlement and Security
- Water Management

Adaptation

Mitigation

3 Main Approaches

Enabling Environment

- Research Studies and Technologies
- CC Local Knowledge and Public Awareness

- Power Generation
- Transportation
- Industry
- Building Energy Consumption
- Waste Management
- Agriculture
- Forest
- Urban Management

- Climate Change Implementing Mechanism
- International Collaboration/Cooperation



2. Thailand's National Adaptation Plan (NAP)

Thailand's National Adaptation Plan (NAP) identifies the target for 6 vulnerable sectors namely

- 1) Agriculture and Food Security
- 2) Natural Resource Management
- 3) Public Health
- 4) Tourism
- 5) Human Settlement and Security
- 6) Water Resources Management

The vision of NAP is “Thailand is resilient and adapts to the impacts of climate change to active sustainable development goals”. The mission is “to integrate climate resilience into national development, to enhance capacities and raise awareness at all levels and to develop databases, research, knowledge, and technology”. The sectors under the NAP are well aligned with the sectors under the GGA framework. Thailand already submitted the NAP since April last year.

There was the signing MOU event on “Integrated Cooperation for Advancing Climate Change Adaptation under the National Climate Change Adaptation Plan” between 7 ministries related 6 sectors above in February 2025.

There are many steps to be taken in developing Thailand's Action Plan on Adaptation as follows,

- Identifying impacts and prioritizing risk areas by sector.
- Setting objectives, indicators, measures, plans, projects, budgets, timelines, and identifying responsible agencies for implementing adaptation actions in risk areas.
- Developing recommendations and approaches to drive the implementation of the action plan in collaboration with relevant agencies, including institutional structures, financial mechanisms, monitoring and evaluation, capacity building.

3. Thailand's Health National Adaptation Plan (HNAP) 2021-2030

Thailand's Health National Adaptation Plan (HNAP) 2021-2030 focuses on vector-borne diseases, heat-related illness, flooding, water-borne diseases and respiratory diseases. Vision is “Thailand operates on internationally recognized excellence and becomes leader in risk management on health impacts from climate change”. The objective is “to reduce illness, lessen health impacts, and become a center for health and climate change in aspect of climate change induced health risk management” with 4 core strategies consisting of



- 1) **H: Health Literacy** - Strengthening community and their skills in adaptation and health literacy to cope with health risks from climate change.
- 2) **N: Networking for capacity building** - Integrating the resources of all sectors to proficiently drive public health implementation climate change.
- 3) **A: Advocacy for commitment** - Strengthening public health preparedness for climate change support economic and social development and security.
- 4) **P: Public health preparedness** - Developing the national public health system in response to climate change on an international standard.

4. Climate Change Act - article 12:

Climate Change Act - article 12: Climate change adaptation that is expected to be concluded soon. The act is divided into 2 parts as following:

Part 1 is the development of data and knowledge to support planning and drive actions to strengthen resilience against climate change.

Part 2 is the development and implementation of the National Adaptation Plan.



Module 3:



Climate Change Health Risk Assessment and Health Impact

Prof. Dr. Kraichat Tantrakarnapa,
Department of Social and Environmental
Medicine, Faculty of Tropical Medicine,
Mahidol University



Principle at risk from Climate Change

Human environments and inter-population dynamics have undergone significant transitions over time. Currently, the most prominent drivers of change include globalization, urbanization, and climate change. These interconnected forces are reshaping health determinants and increasing vulnerability to climate-related impacts.

It is important to distinguish between climate variability and climate change: climate variability refers to short-term fluctuations around the average weather conditions, whereas climate change refers to long-term shifts in climate patterns that occur over decades or longer.

Impact Chain

The “impact chain” of climate change describes the progression of effects from rising greenhouse gas concentrations to various consequences, including increased temperatures, altered weather patterns, sea-level rise, and impacts on ecosystems and human societies. Climate change poses risks to several principles; Physical Risks, Transition Risks, Liability Risks, and Financial Stability.

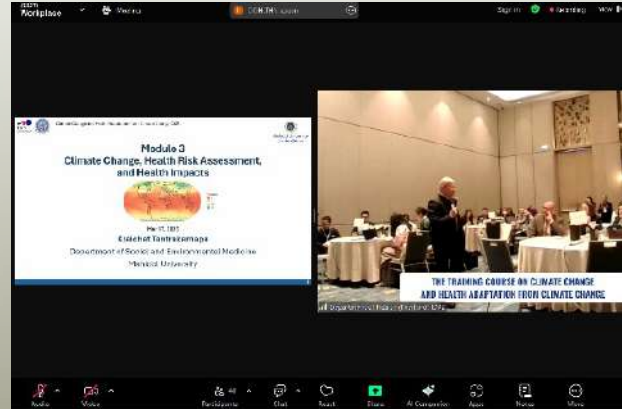
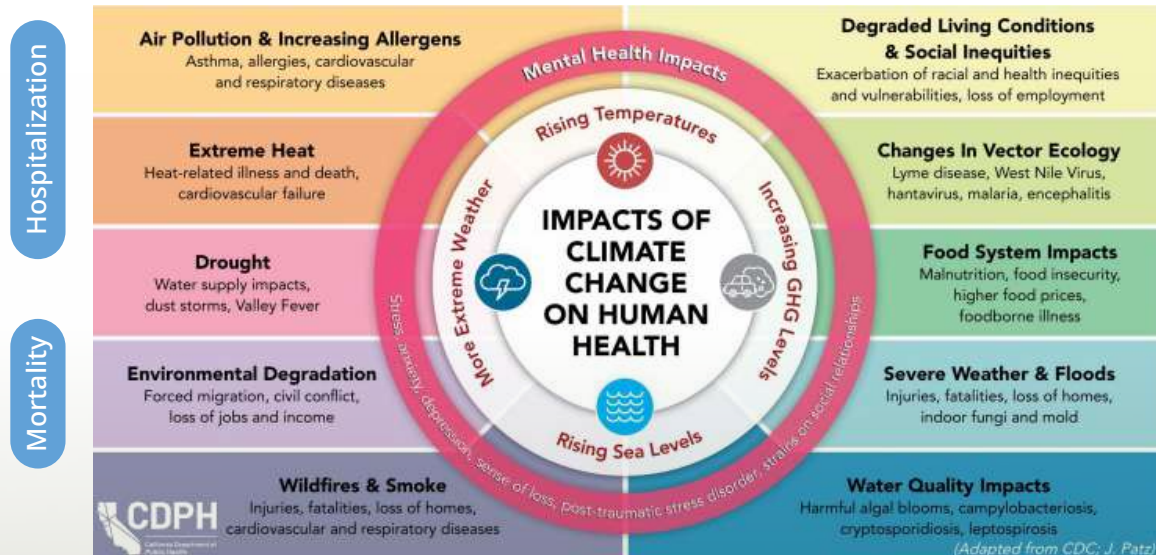
Health Risk Assessment of Climate Change:

Health is part of the sustainability ‘system’ for example, Urban climate health systems. Health risks comprised of increasing heat-related illnesses, the spread of infectious diseases and the impacts on air and water quality that require a comprehensive risk assessment to inform public health strategies and adaptation measures. Climate change causes direct (floods, storms, heat), indirect (allergens, disease vectors) and economic & social disruption (malnutrition, refugees) that can link to health impacts. The impacts of climate change on health are drought, hunger, vector-borne disease, heat-related mortality, flooding, water-borne disease, water scarcity, sea level rise.

Economic Assessment of the Health Impact of Climate Change

Exposure to PM2.5 has resulted in approximately 50,000 annual deaths in Thailand. Overall, the costs of this excess mortality are equivalent to nearly 15% of Thailand's GDP in 2016. The study benefitted from a lengthy longitudinal dataset of ambient air quality, mostly province-specific health data, and established and emerging risk estimates of mortality and incidence.

Economic Assessment of the Health Impact of Climate Change



Workshop / Group Discussion: Health Impact of Climate Change



Prof. Dr. Kraichat Tantrakarnapa,
Department of Social and Environmental Medicine,
Faculty of Tropical Medicine,
Mahidol University

As part of the training on climate change and health, a Workshop and Group Discussion was conducted under the theme: **“Impact Chain: Understanding the Interconnections between Climate Change, Health, and Energy Insecurity.”**

The session involved a total of onsite participants, divided into 4 groups, and online participants, divided into 2 virtual groups. Each group was tasked with analyzing the following discussion topic: “How are climate change, health/care of the all-age population, and energy insecurity interconnected?”

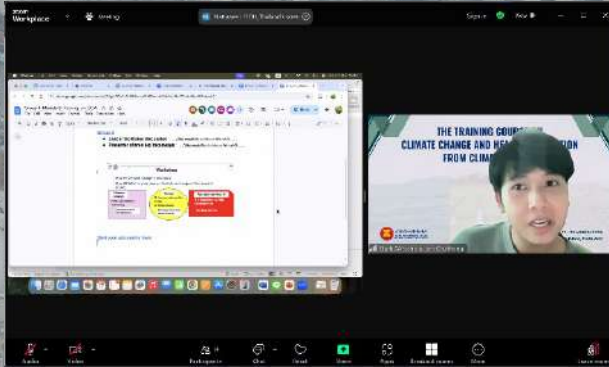
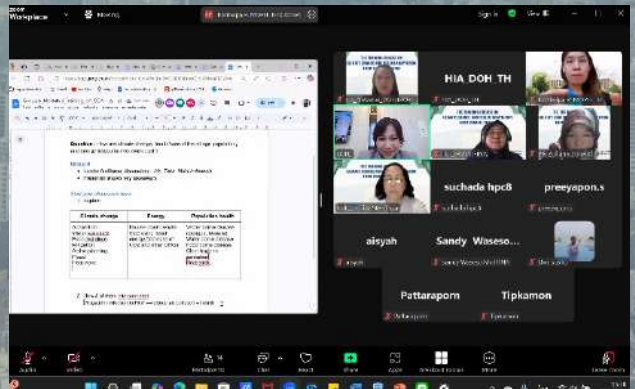
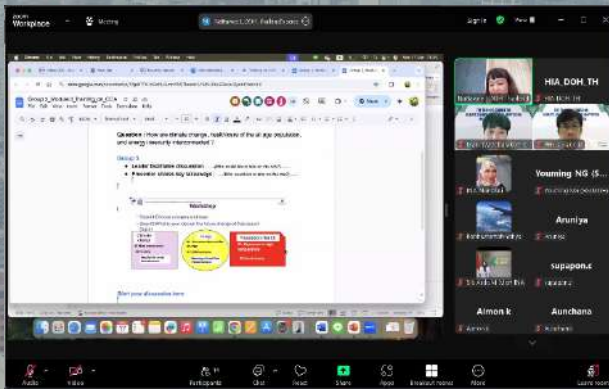
Participants were encouraged to examine the impact chain from root causes to health outcomes by identifying direct and indirect linkages, mediating factors, and potential interventions.

Key Outcomes

- Participants developed a clearer understanding of how climate change affects health through various pathways, especially when combined with energy insecurity.
- The discussion enabled participants to recognize the interconnectedness of environmental and social determinants of health, particularly across different age groups.
- The session fostered systems thinking, allowing participants to map cause-effect relationships and potential leverage points for intervention.

By the end of the activity, participants demonstrated greater awareness of the health impacts of climate change and a deeper appreciation for integrated approaches to policy and planning.





Module 4:



Health Impacts from Climate-related hazards

Prof. Dr. Kraichat Tantrakarnapa,
Department of Social and Environmental
Medicine, Faculty of Tropical Medicine,
Mahidol University



1. Extreme Events: Thermal Extremes

Extreme thermal events, including both heat and cold extremes, significantly increase morbidity and mortality. However, many of these health outcomes are preventable. Thermal stress also reduces worker productivity. Climate change contributes to more frequent, prolonged, and intense heatwaves, amplifying their impacts. Larger and aging populations face heightened risk, but effective adaptation strategies can mitigate both current and future health burdens.

Thermal extremes refer to short-duration weather conditions that fall at the extremes (tails) of the annual or seasonal temperature distribution. Their impacts are typically assessed using “excess” health indicators, such as increases in daily mortality rates the following groups are particularly vulnerable to thermal extremes:

- Older adults and children
- Individuals with chronic illnesses or disabilities
- Low-income populations
- People with limited access to cooling systems or healthcare services
- Individuals engaged in physically demanding outdoor activities

Thermal extremes are identified using meteorological data based on fixed or relative temperature thresholds. These thresholds are context-specific and vary by geographic region and season. Health surveillance data is also used to correlate extreme events with adverse health outcomes.

In addition to increasing mortality rates, thermal extremes contribute to reduced labor productivity and elevated hospital admissions. The relationship between ambient temperature and mortality is often described as a U-shaped curve, where both high and low temperature extremes are associated with increased premature deaths

Effective risk management and adaptation strategies are critical to reducing the health impacts of thermal extremes. Key measures include:

- Establishing early warning and response systems to alert populations and coordinate timely interventions.
- Expanding and maintaining urban green spaces to mitigate the urban heat island effect and provide natural cooling.
- Redesigning infrastructure to enhance resilience against extreme heat conditions, including heat-tolerant building designs and materials.
- Strengthening social care networks to support vulnerable populations during extreme thermal events.
- Providing public cooling facilities to ensure equitable access to safe, cool environments during heatwaves

All adverse health outcomes from thermal extremes are preventable. Proactive adaptation can reduce health risks and socioeconomic impacts due to climate-induced thermal events.

1. Sea levels

Several factors contribute to the ongoing rise in sea levels:

- Thermal Expansion: As the ocean warms due to climate change, water expands, taking up more space and causing sea levels to rise.
- Melting Glaciers and Ice Sheets: Increased temperatures lead to glaciers and ice sheets melting at a faster rate, adding more water to the oceans and contributing to sea level rise.
- Water on Land Shifting to Oceans: Changes in precipitation patterns and groundwater levels can lead to more liquid water flowing into the oceans.

Impacts of Sea Level Rise

- Increased Coastal Flooding: Rising sea levels lead to more frequent and severe coastal flooding, especially during high tides and storms. Coastal communities may be forced to relocate due to rising sea levels and increased flooding
- Coastal Erosion: As sea levels rise, coastal areas become more vulnerable to erosion, leading to the loss of land and infrastructure.
- Salinization of Coastal Areas: Increased saltwater intrusion into freshwater sources and soil can contaminate drinking water and damage crops.
- Displacement of Populations: Coastal communities may be forced to relocate due to rising sea levels and increased flooding

3. Air Pollution

Air pollutants

- Carbon monoxide (CO)
- Nitrogen dioxide (NO₂)
- Lead (Pb)
- Sulfur dioxide (SO₂)
- Particulate matter (PM_{2.5}, PM10)
- Ozone (O₃)

Strong evidence for causal relationship between air pollution & premature death

- Time series studies of acute effects
- Cohort or cross-section studies of chronic effects

Exposure to air pollutants arises from multiple sources, including industrial emissions, vehicle exhaust, and forest fires occurring in many countries. Air pollution is a major environmental risk to health, contributing to conditions such as stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma.

Time series analyses examine a series of daily observations of air pollution and health outcomes to determine short-term, acute effects. This approach is widely used and cost-effective, often utilizing readily available data. Temporal studies help to avoid many of the confounding factors that can affect spatial studies. However, time-varying factors, such as seasonal cycles, weather variables, and the day of the week, may confound the associations between air pollution and health outcomes.

The mixtures of air pollutants produced by burning of fuels & by wildfire can adversely affect human health directly & indirectly.

- Elevated concentrations of particulate matter & ozone cause significant mortality
- Climate variability can influence air quality, resulting in adverse health consequences. Includes effects on aeroallergens like pollen
- Reducing the sources of air pollution would prevent avoidable premature mortality
- Review of evidence: City level data available at: <http://apps.who.int/gho/data/view.main.AMBIENTCITY2014?lang=en>



4. Vector Distribution and Ecology

Vectors, such as mosquitoes and ticks, are arthropods or small animals that transmit infectious diseases. Transmission pathways can be categorized as:

- Human-vector-human transmission (e.g., malaria, dengue, yellow fever)
- Animal-vector-human (zoonotic) transmission (e.g., Lyme disease, West Nile virus)



Impact of Climate Change on VBDs

- **Temperature Rise:** Increases in temperature affect vector survival rates, reproductive cycles, and feeding behaviors. Higher temperatures also accelerate the incubation period of pathogens within vectors, facilitating faster transmission.
- **Changes in Precipitation:** Altered rainfall patterns influence the availability of breeding sites for vectors, such as standing water for mosquitoes, potentially either boosting or diminishing vector populations depending on rainfall levels and humidity.
- **Extreme Weather Events:** Events such as tropical cyclones have been associated with surges in hospitalization rates due to infectious diseases linked to vector proliferation.



Vector and Host Seasonality

- Seasonal variations in temperature impact vector development, activity levels, and the efficiency of pathogen transmission.
- Host population dynamics, including reproduction and mortality rates, are influenced by both weather conditions and the availability of essential resources.

Geographical and Temporal Patterns

- Climate change is driving shifts in the geographical distribution and seasonal activity of vectors. For example, mosquitoes are now increasingly found in highland regions where they previously could not survive.
- Notable examples of climate-sensitive VBDs include the spread of malaria into higher altitudes in East Africa, the northward expansion of schistosomiasis in China, and the global rise in dengue incidence.



Case Example: Malaria

- In 2023, 263 million malaria cases and 597,000 deaths occurred globally.
- 94% of cases and 95% of deaths were in the WHO African Region, with children under five being the most affected.

Adaptation Opportunities

- Strengthening disease surveillance
- Enhancing healthcare system capacity
- Adopting precautionary and cross-sectoral approaches
- Preparing for emerging pathogens and shifting VBD burdens.

5. Water & food-borne diseases

Water-related diseases, such as the water-borne can related disease through by ingestion of water contaminated by human or animal feces or urine containing pathogenic bacteria, viruses or parasites, which result in diseases such as gastroenteritis, enteric hepatitis, amoebic and bacillary dysentery, cholera, leptospirosis, poliomyelitis, typhoid/paratyphoid fever.

Pathways for weather to affect health such as diarrheal disease, which distal causes temperature humidity and precipitation and exposure to survival/replication of pathogens in the environment or contamination of water source and infection hazards by consumption of contaminated water and food and resulting in health outcomes such as incidence of mortality and morbidity attributable to diarrheal.

Climate projections for increased warming and increased extreme events suggest water-borne diseases may increase. Mitigation & adaptation will be enhanced by understanding the ecology of pathogens.

The effects of climate change on water & foodborne diseases can be mitigated, which focus on public health response and basic infrastructure and increased attention to treatment options. Additionally. Public health should also be equipped with tools to address problems and prevent disease and understanding how climate may increase risk can be used to prioritize adaptation or rapid response measures.



Module 5:



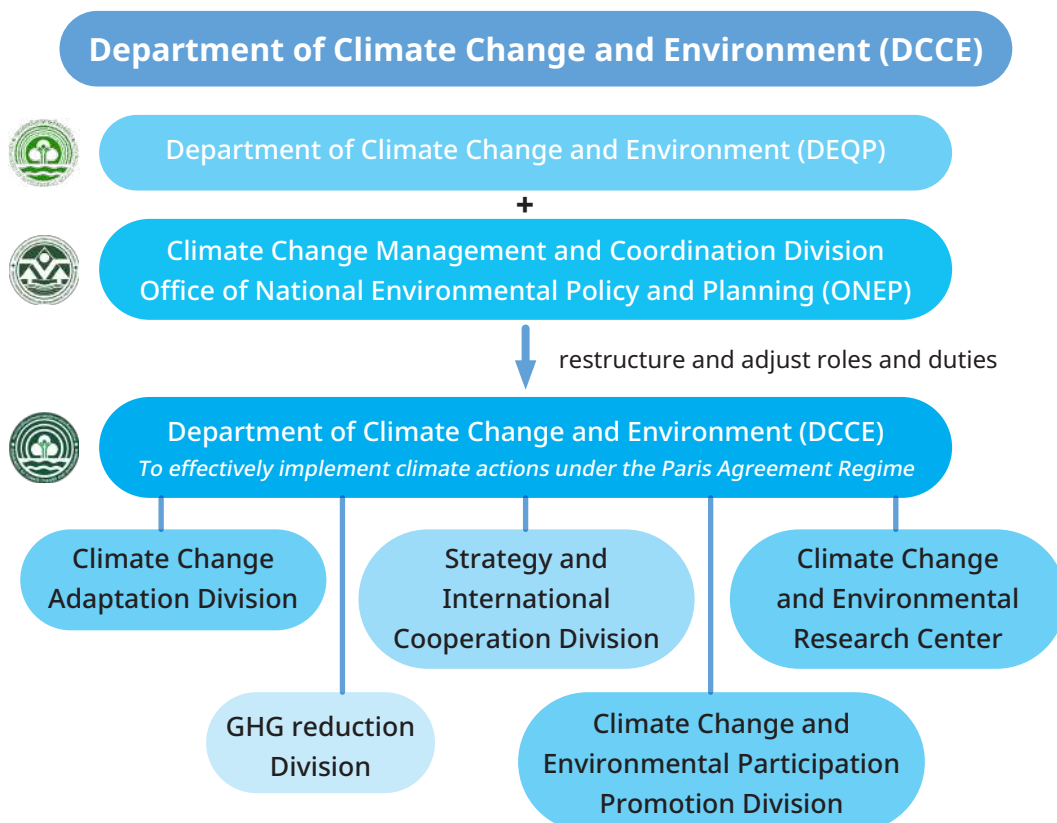
Management and Health Risk Communication from Climate Change

Dr. Atsamon Limsakul,
Department of Climate Change
and Environment, Ministry of
Natural Resources and
Environment (MONRE) of Thailand

This session provides a comprehensive roadmap for Thailand's climate-health adaptation strategy, emphasizing risk communication, local engagement, and policy integration.

Restructuring of Climate Change Governance in Thailand

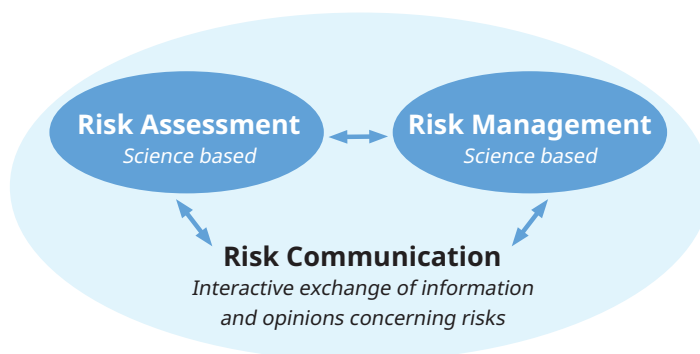
The Department of Climate Change and Environment (DCCE) was restructured in August 2023 to improve climate action implementation. Key Divisions within DCCE are included in this figure;



Started from August 2023

Risk Analysis Framework

Risk assessment and management are integral components of the decision-making process. Effective risk communication is crucial to facilitate collaboration among all stakeholders involved.



Comprehensive Climate Risk Management (CRM) incorporates three interconnected approaches:

- 1) Greenhouse Gas (GHG) Emission Reductions: Efforts to avert future climate-related risks by mitigating the root causes of climate change.
- 2) Adaptation and Risk Management: Strategies to minimize existing and emerging climate risks through proactive planning and interventions.
- 3) Climate Risk Financing: Mechanisms to address and manage residual risks that cannot be fully avoided or mitigated.



Climate Change Adaptation and Risk Communication

Adaptation to climate change is an iterative process of risk management, shaped by people's perceptions, experiences, and knowledge. Effective communication among different actors enhances the adaptation process.

The Government–Expert–Public Risk Communication Model outlines three key channels:

- 1) Government–Public Communication: Ensures that accurate, timely information about climate risks and adaptation strategies is disseminated to the general public.
- 2) Government–Expert Communication: Strengthens policy formulation and decision-making by incorporating scientific evidence and expert insights.
- 3) Expert–Public Communication: Bridges the knowledge gap by translating complex scientific information into accessible knowledge for communities.



Health Risks of Climate Change in Thailand

The major climate-related hazards impacting health include floods, extreme heat, air pollution, drought, food insecurity, and the spread of vector-borne diseases.

Under the high-emission RCP8.5 scenario, the projected health impacts are substantial:

- An estimated 2.4 million people are expected to be affected by floods annually.
- Heat-related mortality among the elderly is projected to reach 58 deaths per 100,000 population by 2080.
- Approximately 10,000 people are expected to be at risk of malaria and dengue by 2070.
- In 2021, an estimated 29,000 premature deaths were attributed to exposure to PM_{2.5} air pollution.

Thailand's Climate Change Policy and Adaptation Plans

Thailand has developed comprehensive policies and plans to address the impacts of climate change and to build national resilience.

Thailand's Climate Change Master Plan (2015-2050)

Vision: To achieve a climate-resilient and low-carbon society.

Focus Areas: Agriculture, water resources, health, tourism, urban planning, industry, and waste management.

Thailand's National Adaptation Plan (NAP)

Goal: To enhance resilience and adaptive capacity across all sectors.

Key Measures:

- Prevention of health risks through strengthening healthcare systems and increasing public awareness.
- Establishment of public health support mechanisms, including disease monitoring systems, insurance reforms, and improved emergency response frameworks.

Health National Adaptation Plan (2021-2030)

Aim: To reduce the burden of climate-related illnesses and position Thailand as a regional leader in managing climate and health risks.

Risk Assessment for Thailand's Health Sector

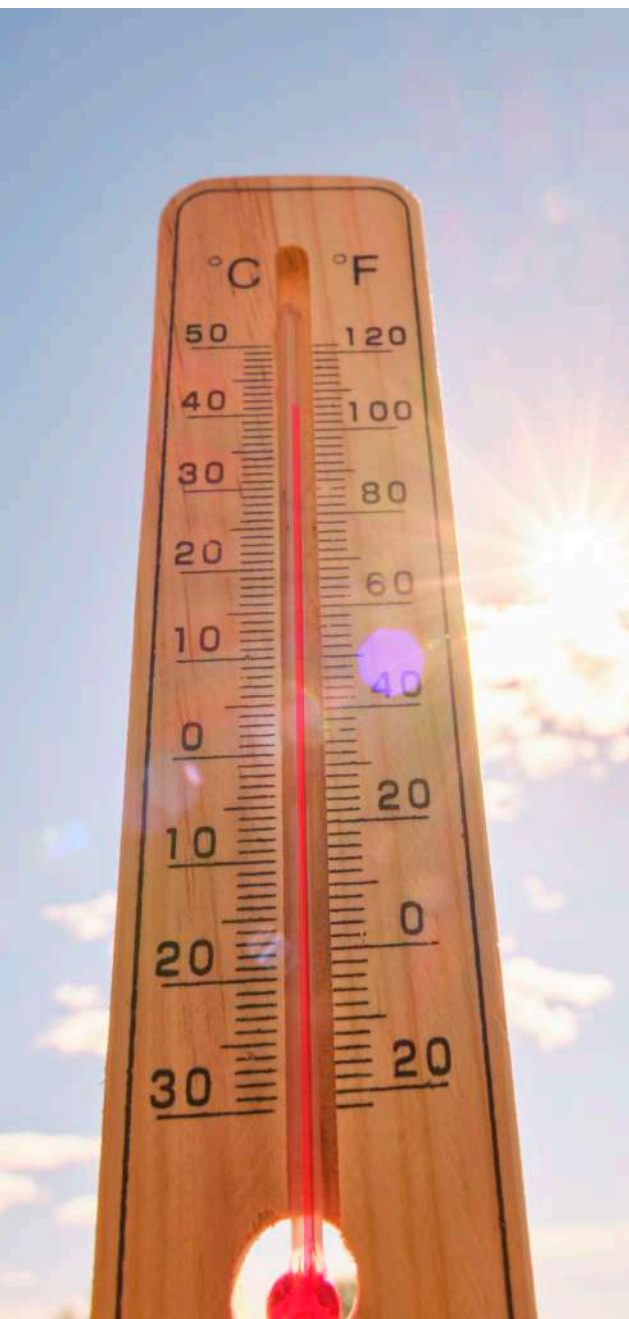
Thailand's health sector conducts climate risk assessments based on the IPCC-AR5 Risk Framework, which considers three key components:

1) Climate Hazards: Including temperature extremes, changes in rainfall patterns, floods, and droughts.

2) Exposure: Reflecting factors such as population density and the presence of vulnerable groups.

3) Vulnerability: Focusing on specific at-risk populations, such as the elderly, individuals with chronic illnesses, and communities in areas experiencing water stress.

To support risk-informed planning, provincial-level health risk indices have been developed. These indices map climate-related health risks and identify hospitals that are particularly vulnerable to climate impacts.



Managing Extreme Heat and Air Pollution Risks

Development of Heat Index (HI) and Online Platforms:

- Early warning systems for heat stress in Northern Thailand.
- Community-based risk communication (e.g., Mae Chai District, Phayao Province).
- Simple heat risk warning instruments for local use:

Prototype 1: Portable, low-cost, easy-to-use heat monitoring tool.

Prototype 2: Digital heat warning system with LCD display and online integration.

Local-Level Pilot Areas for Climate Health Adaptation:

- Maha Sarakham, Chaiyaphum, and Phuket among others.
- Heat warning tools deployed in schools, hospitals, and communities.

Innovations in Climate-Health Management

- Digital signage and infographics for climate health risk communication.
- Community-driven adaptation strategies.
- Integration of climate change in public health frameworks.

Key Takeaways

- Thailand has restructured its climate governance to better align with international agreements.
- The country faces severe climate-related health risks, particularly from floods, heatwaves, and air pollution.
- National policies, such as NAP and the Climate Change Master Plan, focus on adaptation and risk management.
- Local-level interventions (e.g., heat index monitoring, early warning systems) are crucial for public health adaptation.
- Innovative health adaptation tools (e.g., digital signage, portable warning devices) enhance community resilience.



Module 6:



Health and Climate Change Adaptation and Low - Carbon Healthcare Facilities

Assoc. Prof. Dr. Suthirat Kittipongvises,
Sustainable Environment Research Institute,
Chulalongkorn University



The adaptation of the healthcare sector to climate change and strategies for reducing carbon emissions in healthcare facilities in Thailand. The key areas covered include:

Environmental Impact of the Healthcare Sector

- The healthcare sector accounts for 4.4% of global greenhouse gas (GHG) emissions.
- Reducing carbon emissions in healthcare is crucial for achieving climate goals.
- A study on the environmental impact of healthcare facilities in Thailand was conducted by HITAP and Chulalongkorn University.

Quantification of GHG Emissions from Healthcare Facilities in Thailand

Using the Greenhouse Gas Protocol, emissions are categorized into four scopes:

- Scope 1 (Direct Emissions from Facilities) → Energy from fuel and hospital vehicles.
- Scope 2 (Indirect Emissions from Electricity Use) → Based on electricity bills.
- Scope 3 (Other Indirect Emissions) → Waste disposal, water consumption, paper use, staff commuting.
- Non-Protocol (Additional Emissions) → Patient travel to healthcare facilities.

Key Findings:

- Tertiary healthcare facilities had the highest GHG emissions.
- Patient transportation was the largest contributor to emissions, followed by electricity usage.
- The supply chain's emissions and the economic benefits of low-carbon measures require further study.



Transition to “Low Carbon & Resilient Smart Health Care” (Implemented from 2020-2022)

- Adoption of environmentally friendly treatment technologies.
- Low-carbon building design.
- Investment in green energy.
- Waste minimization and sustainable waste management.
- Green and low-carbon procurement.
- Climate-resilient healthcare systems.



Thailand’s Health National Adaptation Plan (HNAP) (2021-2030)

- Strengthening community adaptation skills and health literacy to cope with climate risks.
- Integrating resources from all sectors to drive climate-resilient public health initiatives.
- Enhancing healthcare preparedness for climate-related challenges.
- Developing a sustainable national healthcare system to respond to climate change.

“GREEN & CLEAN” Healthcare Initiative

The Department of Health promotes “GREEN and CLEAN” Healthcare Initiative “GREEN” activities:

G (Garbage) – Waste management.

R (Restroom) – Hygiene and sanitation.

E (Energy) – Energy efficiency.

E (Environment) – Creating an eco-friendly healthcare environment.

N (Nutrition) – Promoting healthy and sustainable food.

And **CLEAN** strategies:

C (Communication) – Environmental awareness and education.

L (Leader) – Leadership in environmental sustainability.

E (Effectiveness) – Efficient resource utilization.

A (Activities) – Environmental initiatives and projects.

N (Network) – Expanding environmental networks.





Challenges and Barriers

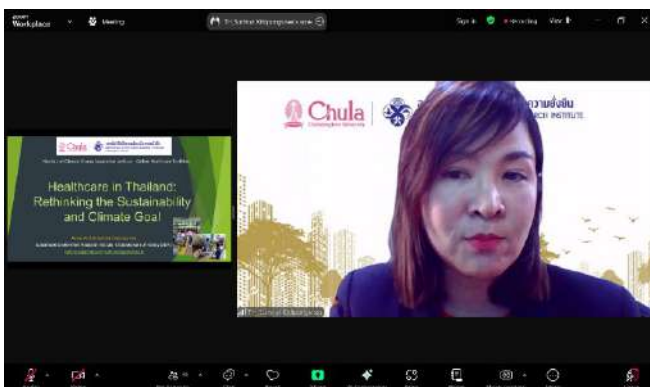
- Financial constraints for transitioning to green healthcare.
- Balancing adaptation and mitigation efforts from policy to implementation.
- Data management and GHG tracking for accurate reporting.
- Sustainable healthcare technology and infrastructure development.
- Improving climate literacy in the healthcare sector.
- Early warning and risk monitoring systems for climate-related health threats.
- Regulatory and policy gaps in sustainable healthcare.
- Community and stakeholder engagement in climate initiatives.

Future Directions (Next Steps)

- Expanding the project to Tambon Health Promoting Hospitals (THPHs) nationwide.
- Enhancing GREEN & CLEAN initiatives by incorporating chemical and mercury waste management.
- Hosting innovation competitions to drive creative solutions in sustainable healthcare (first held in 2015).
- Developing “GREEN and CLEAN Communities” by engaging local communities around healthcare facilities.

Overall Summary

- Focuses on decarbonizing the healthcare sector in Thailand.
- Assesses GHG emissions from hospitals and healthcare facilities.
- Proposes strategies to transition to sustainable, low-carbon healthcare.
- Promotes the GREEN & CLEAN initiative to enhance environmental sustainability in hospitals.
- Emphasizes community engagement and national-level policy development.



Study Trip at the Thonburi Thawiwattana Hospital, Bangkok

Thonburi Thawiwattana Hospital

Background

Thonburi Thawiwattana Hospital, under the Thonburi Healthcare Group (THG), was designated as a model hospital for carbon footprint reduction and sustainable waste management. This initiative aligns with the hospital's long-term commitment to environmental sustainability and climate responsibility.

- In 2022, the hospital achieved carbon neutrality by offsetting 3,795 tons of CO₂ equivalent across Scope 1, 2, and 3 emissions.
- In 2023, the hospital was re-certified for the Carbon Footprint for Organization (CFO) and identified waste management (Scope 3) as a key area for improvement.



Sustainable Waste Management Program

Launched on June 30, 2023, the project aims to systematically reduce greenhouse gas emissions through improved waste handling. The hospital developed a comprehensive waste management policy supported by clear categorization and infrastructure improvements.



Key Components of the Waste Management Project

Waste Management Policy Development

Project Goals:

- Implement proper waste disposal methods
- Raise awareness about correct waste segregation
- Build a positive hospital image in environmental responsibility
- Promote waste reduction concepts

Expected Outputs and Outcomes:

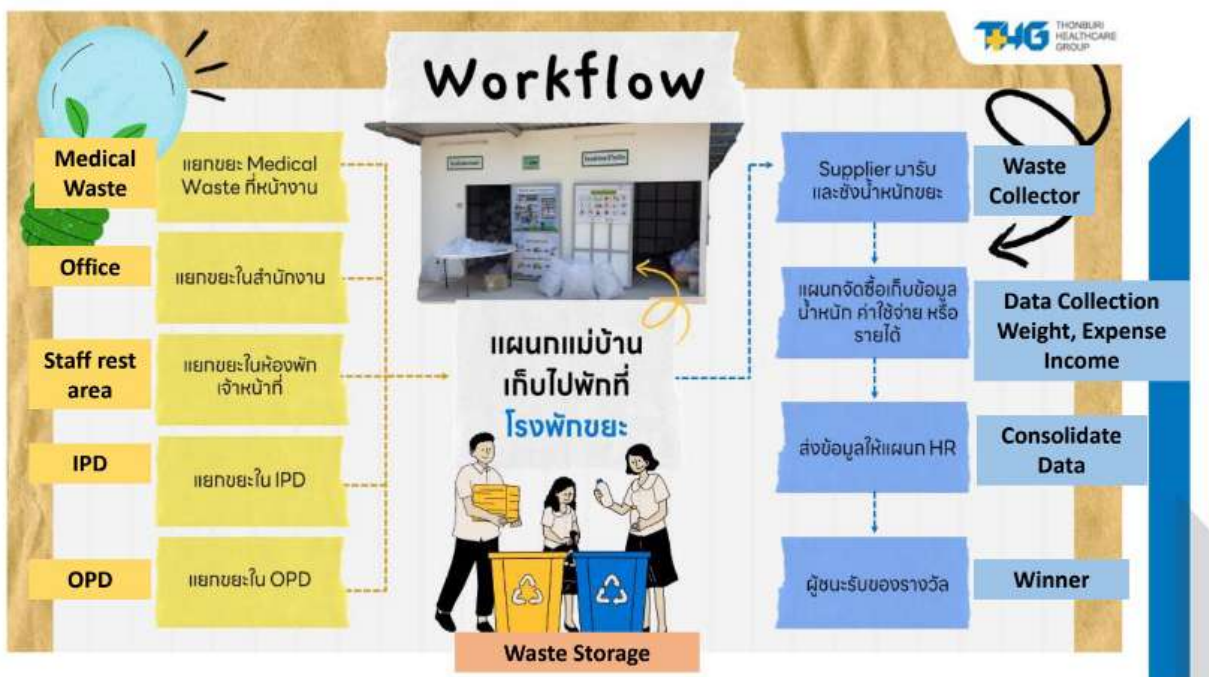
- Accurate segregation of hospital waste according to waste type
- Increased community awareness of the hospital's environmental efforts

Implementation and Staff Engagement

The success of the program was largely driven by active participation and collaboration of hospital staff, who contributed to climate action through various means, including:

- Sorting waste into categories: recyclables, orphan waste, general waste, infectious waste, food waste, and hazardous waste
- Conserving electricity, e.g., using stairs instead of elevators
- Practicing water conservation, such as turning off taps while brushing teeth
- Reducing paper use by printing on both sides

This collective effort by the entire hospital workforce has played a vital role in reducing the environmental impact, enhancing sustainable waste management, and minimizing greenhouse gas emissions effectively and sustainably.





Module 7:



Health and Climate Change Adaptation Development

Assoc. Prof. Dr. Alice Sharp,
Department of Biology,
Faculty of Science,
Chiang Mai University



Re-Capture: climate change & health

Climate change intensifies health risks through extreme heat, extreme weather events, water- and mosquito-borne diseases, and drought. It further threatens coastal ecosystems, worsens air quality with dust plumes, and increases mental health burdens. Addressing these impacts requires urgent action to build resilience and protect vulnerable populations.

There is a rapidly narrowing window of opportunity to enable climate resilient development

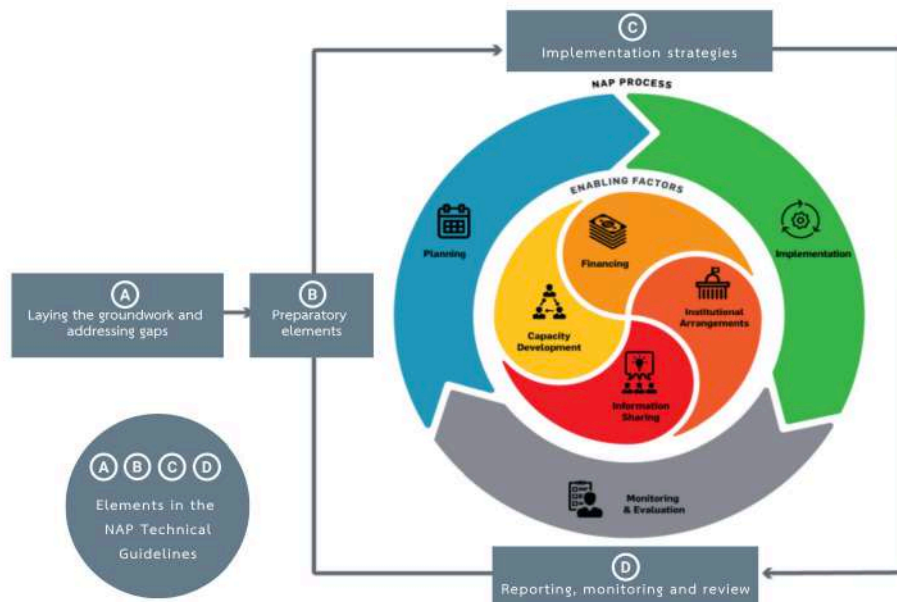
Aspect	Mitigation	Adaptation
Purpose	Reduce GHG emissions and global warming	Reduce climate vulnerability and increase resilience
Measurement	°C, tons of CO ₂ – objective, universal	Context-specific, depends on definition
Application	Global impact regardless of location	Localized, not directly comparable between places

Global post-2015 agendas for a sustainable future

- The Paris Agreement: Limit warming to below 2°C, with efforts toward 1.5°C; financial support; global review every 5 years.
- Sustainable Development Goals (SDGs): SDG 13 targets climate action.
- The Sendai Framework for Disaster Risk Reduction (2015-2030): Aims to reduce disaster

Formulation of Nationally Determined Contributions (NDC):

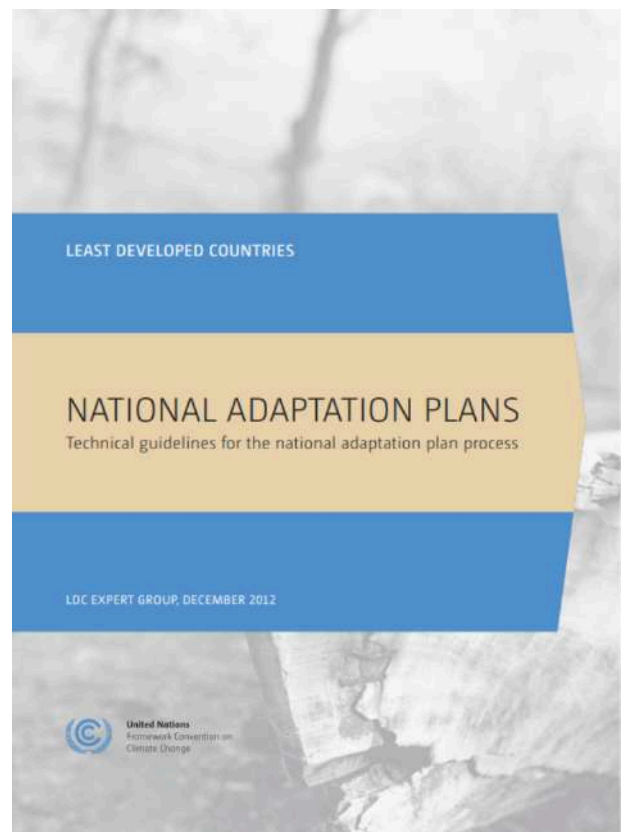
The process of formulating Nationally Determined Contributions (NDCs) under the Paris Agreement. It emphasizes that NDCs (climate action plans) are based on national circumstances and capabilities, and their development involves a cycle of localization, including technical assessment, political commitment, implementation planning, and capacity building, ultimately aimed at achieving climate change goals.



This image illustrates the process of integrating adaptation policy into the mainstream, showing a circular National Adaptation Plan (NAP) process with key enabling factors (funding, capacity development, information sharing, institutional arrangements) at its core. It emphasizes the importance of preparatory elements, planning, implementation strategies, and monitoring/review within this cyclical framework.

Element A: Laying Groundwork a National Adaptation Plan (NAP) process

It details the steps involved (initiating the NAP, stocktaking, addressing capacity gaps, assessing development needs and vulnerabilities) and presents key questions to be answered at each stage to effectively establish the foundation for adaptation planning. The initial steps for “Element A: Lay the groundwork and address gaps” in a National Adaptation Plan (NAP) process. Specifically, it focuses on “Step 1: Initiating and launching the NAP process” and outlines indicative activities such as briefing policymakers, designating a coordinating mechanism, creating a national vision, operationalizing the process, and defining a NAP framework and strategy.



https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high_res.pdf

Example: Case of Thailand Element A: Laying Groundwork a National Adaptation Plan (NAP) process

The institutional arrangement for climate change adaptation. It shows a hierarchical structure starting from the “National Committee on Climate Change Policy” at the top, followed by the “Subcommittee on Climate Change Policy and Planning Integration,” and then the “Working Group on National Climate Change Adaptation Implementation.” Below this working group, there are two parallel levels: the “Sectoral level” which includes sectors like Water, Agriculture, Tourism, Health, Natural resources, and Human aspects, and the “Provincial level” represented by the “Working Group on Climate Change.” Arrows indicate a flow from the higher levels down to the sectoral and provincial levels, suggesting a top-down approach in this institutional arrangement.

Example: Case of Thailand

The institutional arrangement for climate change adaptation. It shows a hierarchical structure starting from the “National Committee on Climate Change Policy” at the top, followed by the “Subcommittee on Climate Change Policy and Planning Integration,” and then the “Working Group on National Climate Change Adaptation Implementation.” Below this working group, there are two parallel levels: the “Sectoral level” which includes sectors like Water, Agriculture, Tourism, Health, Natural resources, and Human aspects, and the “Provincial level” represented by the “Working Group on Climate Change.” Arrows indicate a flow from the higher levels down to the sectoral and provincial levels, suggesting a top-down approach in this institutional arrangement.

Element B: Preparatory Steps

Element B: Step B.1

Analyzing current climate and future climate change scenarios

Analyzing current climate and future climate change scenarios (Temperature)



Figure 1-3: Annual mean maximum temperature in Thailand (°C) during 1951-2021. Source: Thai Meteorological Department.



Figure 1-4: Annual mean minimum temperature in Thailand (°C) during 1951-2021. Source: Thai Meteorological Department.

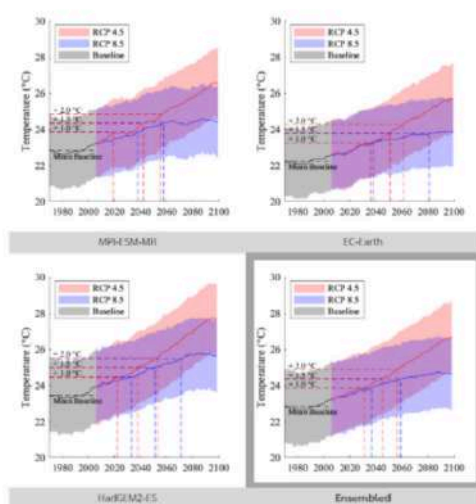


Figure 1-5: Future changes in temperature in Thailand. Source: Thailand Science Research and Innovation (TSRI) and Ramkhamhaeng University, Center of Regional Climate Change and Renewable Energy (RU-CORE).

Analyzing current climate and future climate change scenarios (Precipitation)

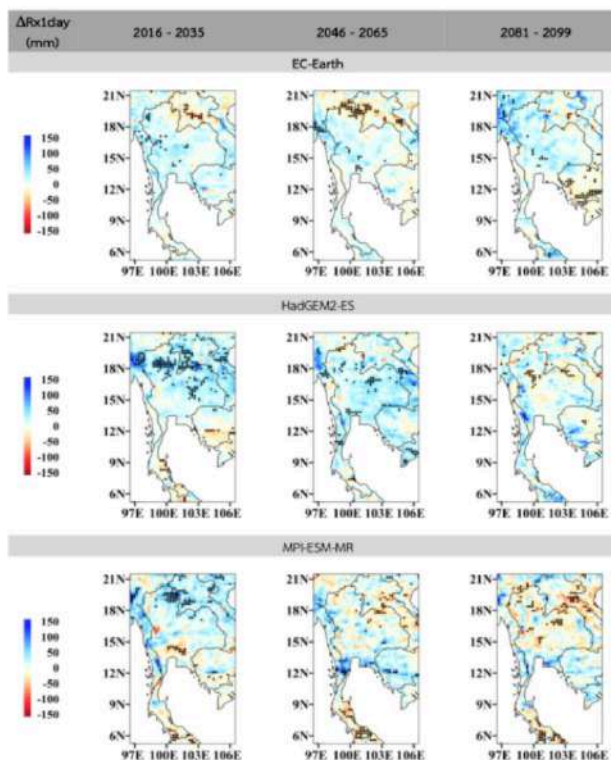


Figure 1-7: Projection of an Rx1day anomaly under RCP4.5.

Source: Thailand Science Research and Innovation (TSRI) and Ramkhamhaeng University, Center of Regional Climate Change and Renewable Energy (RU-CORE).

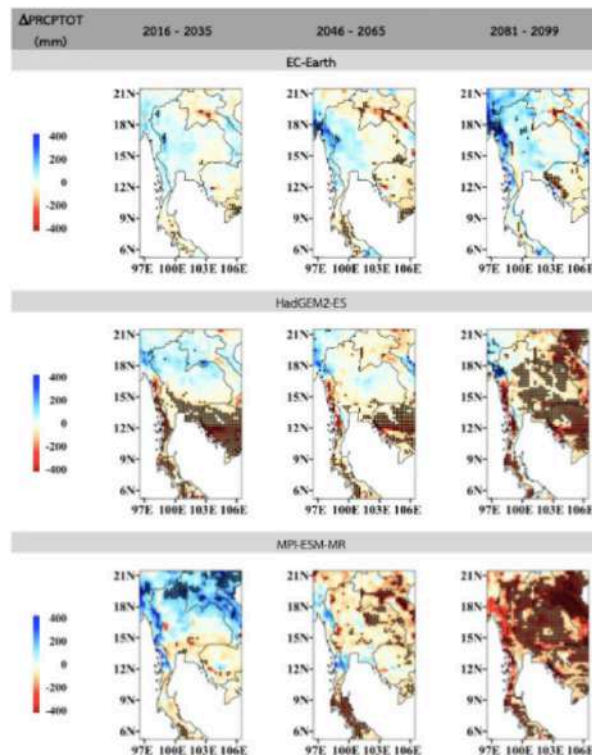


Figure 1-8: Projection of the PRCPTOT anomaly under RCP4.5.

Source: Thailand Science Research and Innovation (TSRI) and Ramkhamhaeng University, Center of Regional Climate Change and Renewable Energy (RU-CORE).

Element B: Step B.2

Assessing climate vulnerabilities and identifying adaptation options at the sector, subnational, national and other appropriate levels

Assessing & Prioritizing Climate Vulnerability.

The probability of a given climate hazard: the general probability for change in climate hazard (such as temperature or extreme precipitation events) occurring

The likelihood of impact occurrence: the likelihood that a change in each climate hazard (e.g., temperature rise) will result in a particular impact

The magnitude of the consequence: the combined impacts, should a given hazard occur.

		Impact				
		Negligible	Minor	Moderate	Significant	Severe
Likelihood	Very Likely	Low Med	Medium	Med Hi	High	High
	Likely	Low	Low Med	Medium	Med Hi	High
	Possible	Low	Low Med	Medium	Med Hi	Med Hi
	Unlikely	Low	Low Med	Low Med	Medium	Med Hi
	Very Unlikely	Low	Low	Low Med	Medium	Medium

Assessing & Prioritizing Climate Vulnerability

- High Severity & low likelihood - Proceed next : There was no severity in the past, but it is likely to become more severe in the future.
- High Severity & high likelihood - Take immediate action: It occurred in the past with severity, is likely to occur in the future, and is expected to become more severe.
- Low Severity & low likelihood - No action required: It was not a problem in the past and is unlikely to become an issue in the future.
- Low Severity & high likelihood - Take action last: It occurred in the past and might happen again in the future, but its severity is likely to decrease.



Assessing Climate Adaptation Options

Once vulnerabilities and risks have been ranked, adaptation options must be identified to address them.

Categories of Adaptation Measures

1. Structural and physical adaptation
 - structural / engineering options: “concrete activities”
 - discrete activities with a collective objective(s) outcomes and outputs narrowly defined in scope, space, and time
2. Social adaptation
 - educational, informational, behavioral options
 - Community-based adaptation (CBA)
3. Institutional adaptation
 - institutional measures to foster adaptation
 - economic instrument, social policies, laws and regulation, government policies and programs

Element B: Step B.3

Reviewing and appraising adaptation options, from the risks that require immediate adaptation actions (risks in the upper-right frame), define goals and identify various possible adaptation strategies and activities. Then select adaptation strategies for implementation by setting criteria for selecting activities that are suitable for the area.



Bangkok Master Plan on Climate Change (Adaptation):

The Bangkok Master Plan on Climate Change (Adaptation) outlines the vision for Bangkok in 2021, 2030 “Green city where all stakeholders have adequate information and are resilient to mitigate climate risks”, and 2050 “Smart and resilient city valuing participation as a pathway to climate change adaptation for sustainable development”.

The plan identifies key climate-related hazards like inland floods, coastal floods, droughts, and extreme heat, which are projected to worsen over time (e.g., more intense floods, shifting seasons, increasing average maximum temperature).

It also describes the adaptive capacity, moving from “Low capacity” in 2021 (emphasis on disaster relief) to “Medium capacity” by 2030 (more focus on disaster prevention and increased public awareness) and “High Capacity” by 2050 (employment of advanced technology, infrastructure, and public readiness).

Finally, the goals and indicators for various sectors, including Water resources management, Agriculture and food security, Tourism, Public health (aiming to reduce treatment cost and fatality from climate-related disasters), and Natural resources management. Each sector has specific goals and measurable indicators to track progress in climate change adaptation.

Selection of Adaptation Measures for Implementation.

The working group jointly considers the selection criteria and the weighing of the criteria. For example, the following selection criteria (which can be adjusted) are proposed:

- Urgency - Weight: 25%
- Cross-Cutting Benefits - Benefits related to other sectors or greenhouse gas Mitigation - Weight: 15%
- Contribution to Higher Policy Goals - Alignment with higher-level policies - Weight: 15%
- Efficiency/Cost-Effectiveness - Effectiveness and cost efficiency of implementation - Weight: 20%
- Awareness Raising - Promoting awareness among stakeholders - Weight: 15%
- Secured Budget - Availability of a supporting budget - Weight: 10%

Measures/ activities selected as key measures must achieve a total score of no less than 80%.

Element C: Implementation,

Implementation illustrates a step-in climate adaptation planning and monitoring, evaluation, and reporting (MER). The climate adaptation planning process, moving from “Getting Started” to “Risk Assessment”, “Strategy Development”, “Implementation & Mainstreaming”, and finally “Monitoring & Evaluation”

Develop Intervention logic

“Develop Intervention logic” and “Define indicators, possibly emphasizing these as key steps within the implementation phase. Examples of intervention logic components for climate change adaptation. It outlines a cause-and-effect relationship for different climate hazards:

Rainfall: Action - Convert recreational spaces to water squares and parks; Output - Additional water retention area; Outcome - Reduction of floods due to rainfall; Impact - Reduced exposure to flooding.

Storm surge/Sea Level Rise: Action - Installing flood gates; Output - Flood gates installed; Outcome - Reduced storm surge flooding; Impact - Reduced exposure to flooding.

Heat Waves: Action - Increase shade in public areas; Output - Shading structures installed; Outcome - Moderated temperatures; Impact - Reduced exposure to heatwave.

Drought: Action - Rainwater Harvesting; Output - Rainwater collecting system installed; Outcome - Increased water availability; Impact - Reduced vulnerability to drought.

Wildfires: Action - Implement preventive forestry management; Output - Controlled burns; Outcome - Reduced wildfire events; Impact - Reduced vulnerability to wildfires.

Clearly links specific actions taken to address climate hazards with their resulting outputs, intermediate outcomes, and ultimate impacts on reducing exposure and vulnerability.

Define the indicators

CREAM

- **Clear** (precise and unambiguous);
- **Relevant** (appropriate to the subject at hand);
- **Economic** (available at reasonable cost);
- **Accepted** (Accepted as a relevant measure by stakeholders);
- **Monitorable** (Amenable to independent validation).

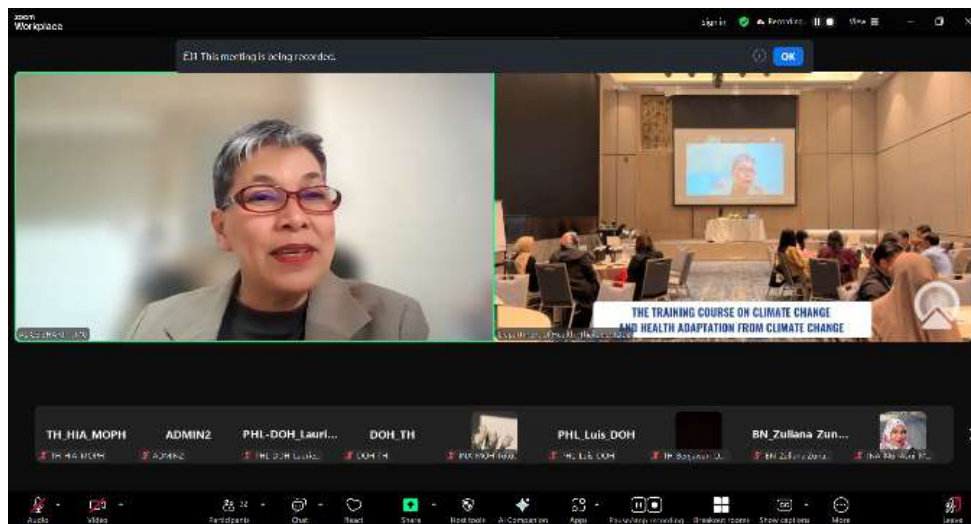
SMART

- **Specific:** Clearly define what you want to measure and avoid ambiguity.
- **Measurable:** Ensure indicators can be quantified or assessed.
- **Achievable:** Set realistic targets that can be reasonably attained.
- **Relevant:** Ensure indicators are directly related to the project’s objectives and outcomes.
- **Time-bound:** Establish a timeframe for achieving the targets.

Consideration: data availability, use existing data already collected by different departments, involvement of stakeholders.

Element D: Reporting Monitoring and Review

- Data collection
- Reporting: Public reporting VS internal or direct reporting
- Reporting Plan
- Reporting tools and templates

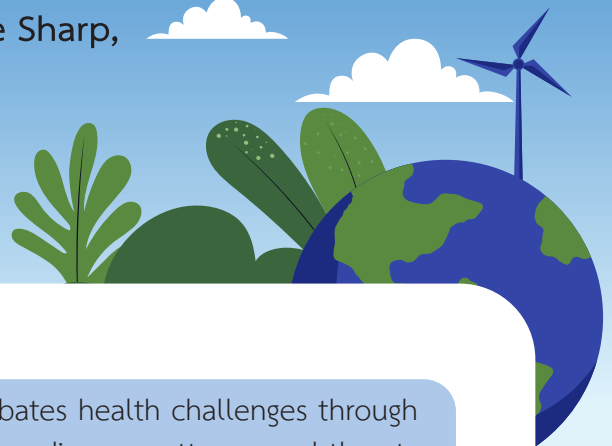


Module 8:



Cooperation for Health and Climate Change

Assoc. Prof. Dr. Alice Sharp,
Department of Biology,
Faculty of Science,
Chiang Mai University



Why is Cooperation needed?

Climate Change Impacts Health: Climate Change exacerbates health challenges through extreme weather events, air pollution, changes in infectious disease patterns, and threats to food and water security.

Health Sector Vulnerability: The health sector is both vulnerable to climate change impacts and a significant contributor to greenhouse gas emissions.

Need for Integrated Approach: Addressing climate change and its health impacts requires a holistic, intersectoral approach, involving health, climate, and other relevant sectors.

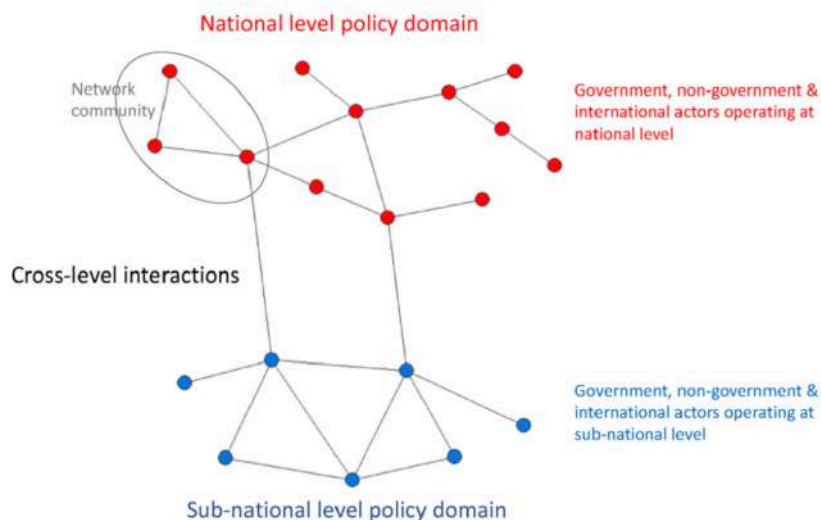
Global Effort: The challenges are global, requiring international cooperation and coordinated action to protect human health and well-being.

Mechanisms for Cooperation

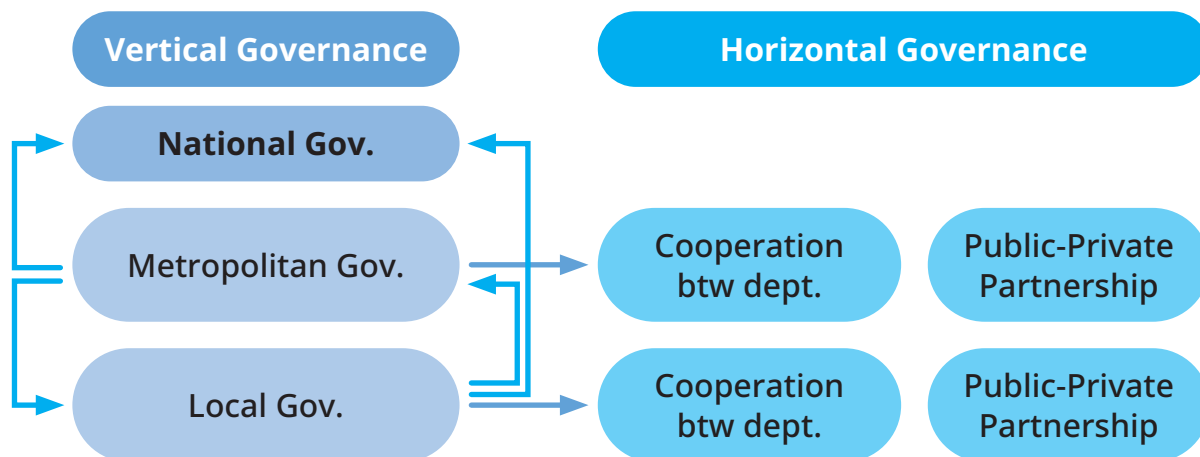


Levels of Cooperation

- Multilevel Adaptation Governance (National & International)



Policy Dissemination



Factor Affecting Climate Change Cooperation - Political and Economic Interests

National Sovereignty: Countries often prioritize their own economic growth and development, which can sometimes conflict with the need for drastic climate action.

Economic Costs: Implementing climate policies can involve significant costs, which some countries may be unwilling to bear, especially developing nations.

Domestic Politics: Climate action can face opposition from powerful vested interests, such as the fossil fuel industry, making it difficult for governments to implement effective policies.

Perceived Fairness: There can be disagreements about how much responsibility different countries should take for climate action, particularly between developed and developing nations.

Free-Riding: Some countries may be tempted to “free-ride” on the efforts of others, hoping that others will take action while they continue to pollute.

Factor Affecting Climate Change Cooperation - The Narrative Problem

Climate Change Denial: The existence and severity of climate change are still disputed by some, making it difficult to build consensus for action.

Lack of Trust: There can be a lack of trust between countries, particularly between developed and developing nations, making it difficult to forge effective agreements.

Focus on Short-Term Gains: Political leaders may prioritize short-term economic gains over long-term climate action, as the benefits of climate action may not be immediately apparent.

Factor Affecting Climate Change Cooperation - The “Adding-Up Problem”

Shrinking Carbon Budget: The amount of carbon dioxide that can be emitted into the atmosphere to avoid dangerous climate change is finite, and the problem of how to fairly allocate this budget among countries can be difficult to resolve.

Zero-Sum Arithmetic: Some see climate action as a zero-sum game, where one country’s gains come at the expense of another’s, making it difficult to find common ground.

Shifts in Economic and Bargaining Power

- **Emerging Economies:** The rise of new economic powers, such as China and India, can complicate climate negotiations, as these countries have different priorities and interests than developed nations.

- **Changing Power Dynamics:** The balance of power between developed and developing nations is shifting, which can lead to new challenges and opportunities for climate cooperation.



Other Factors

Geographic Location and Climate: Some regions are more vulnerable to the impacts of climate change than others, which can create incentives for cooperation.

Natural Disasters: Extreme weather events, such as droughts, floods, and heatwaves, can highlight the urgency of climate action and encourage cooperation.

International Institutions: Organizations like the United Nations Framework Convention on Climate Change (UNFCCC) play a crucial role in facilitating international cooperation on climate change.

Technological Innovation: Advancements in renewable energy and other climate technologies can make it easier and cheaper to reduce emissions, which can encourage cooperation.

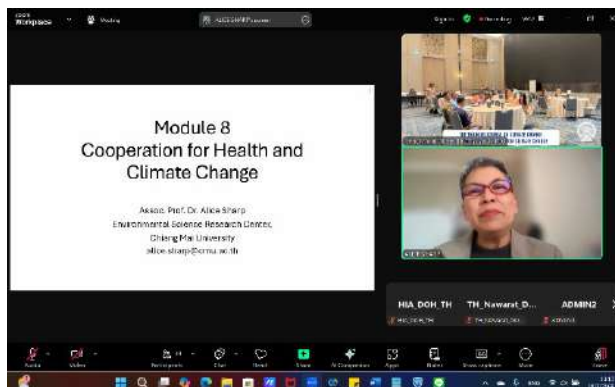
Public Awareness and Pressure: Growing public awareness and concern about climate change can put pressure on governments to take action.

Key Areas of Cooperation

- Raising Awareness: Educating the public, policymakers, and health professionals about the health impacts of climate change and the benefits of climate action.
- Strengthening Health Systems: Building climate-resilient health systems that can predict, detect, prepare for, and respond to climate-related risks and disasters.
- Advocacy and Policy: Promoting policies and initiatives that integrate climate considerations into health planning and practice.
- Research and Evidence: Enhancing scientific understanding of the linkages between climate change and health and developing evidence-based interventions.
- Capacity Building: Training health professionals to address climate related health risks and promote the use of climate-informed tools and technologies.
- Collaboration and Partnerships: Fostering partnerships between health organizations, climate agencies, researchers, and other stakeholders.
- Transitioning to Low-Carbon Health Systems: Reducing the carbon footprint of the health sector by adopting clean energy, sustainable practices, and low-carbon technologies.
- Addressing the Root Causes: Working across sectors to address the root causes of climate change and its impacts on health, such as air pollution, water quality, and food security

Examples of Collaborative Efforts:

- WHO-WMO Joint Office for Climate and Health → [ClimaHealth.info](https://climahealth.info):
- A global platform launched by WHO and WMO to promote collaboration and knowledge sharing on climate and health.
- AP-PLAT works hand-in-hand with partners to conduct joint research, co-create knowledge products and engage in collaborative undertakings.
- NAP Global Network



Country Experience with Climate Change and Health Policy Implementation and Management

This session provided an opportunity to share and update the experiences of each country regarding climate change and health, with the aim of continuously improving and effectively advancing policy implementation and management. The session included both onsite and online participants representing 10 countries: Armenia, Bhutan, Egypt, Indonesia, Jordan, Liberia, Malaysia, Philippines, Sri Lanka, and Thailand.

The discussion was structured around four key content areas:

1. General Information on Climate Change and Health

This included an overview of each country's climate and health profile, demographic characteristics, and the structure and capacity of national health systems.

2. Policy on Climate Change and Health

Participants presented their countries' existing policies, laws, and regulatory frameworks that address the intersection of climate change and health. This highlighted the progress made in integrating climate-health considerations into national development planning.

3. Health Adaptation Implementation and Management

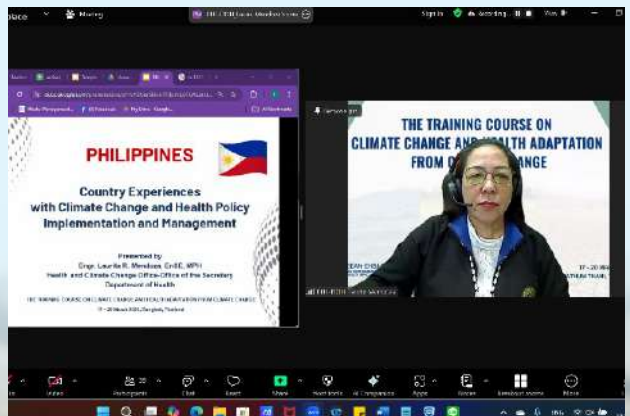
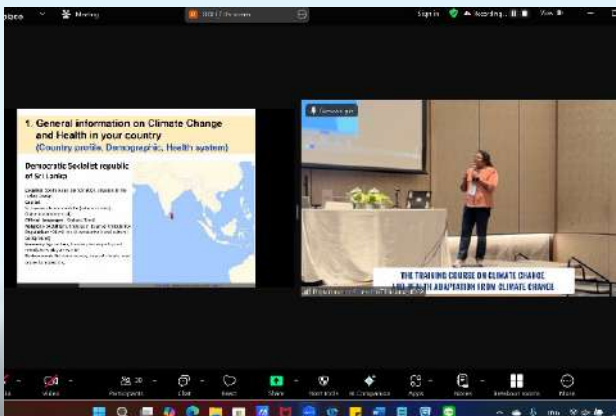
Countries shared their experiences in implementing health adaptation strategies, including climate and health risk assessments, early warning systems, infrastructure improvements, and capacity-building initiatives.

4. Lessons Learned and the Way Forward

Each country reflected on the challenges faced—such as limited resources, data constraints, and coordination gaps—and shared opportunities and strategic directions for strengthening climate-resilient health systems moving forward.

This session successfully facilitated mutual learning and collaboration among countries, promoting regional and global cooperation to enhance climate and health resilience.





The Closing Remarks



Dr. Thiti Sawaengtham,
Deputy Director-General,
Department of Health,
Ministry of Public Health of Thailand



Mr. Grisada Phakakarn of the Thailand International Cooperation Agency,
Distinguished speakers,
Honored guests, and onsite and online participants.

First of all, I am truly honored to be here to and give the certificates to onsite participants, and deliver the closing remarks for the Training Course on Climate Change and Health Adaptation from Climate Change. I would like to extend my heartfelt congratulations and appreciation to everyone who has successfully completed the training.

As all of you have already learned in this training, climate change is one of the major challenges that the healthcare system must face and adapt, in order to reduce health risks arising from its impacts. Throughout this training, we have had the opportunity to learn together, share experiences, enhance our skills, and deepen our knowledge. These are crucial steps in driving efforts to adapt to climate change at the national and regional levels.

This training not only builds a deeper understanding of the health impacts of climate change, but also provides an opportunity to learn how to utilize tools for assessing and managing risks, analyzing vulnerabilities, and developing adaptation policies or plans associated with climate change. Additionally, participants had the chance to engage in a site visit, which will help you adapt your implementation effectively.

I am confident that the knowledge and experience that you have gained will be valuable in developing, extending, and applying them to drive the implementation that bring the greatest benefits to yourself, the organization, and the country.

In closing, I would like to express my sincere gratitude for the support provided by the Thailand International Cooperation Agency, the ASEAN Secretariat, and all the distinguished speakers for sharing their experiences and knowledge, the team who made this training successful and achieved its objectives. And more important of all, thank you to you all for your cooperation and participation throughout these four days. Everyone is an important force in driving the implementation of climate change adaptation.

I wish you a safe trip home and thank you once again to everyone for participating in this training. Thank you very much.

The Closing Remarks



Mr. Grisada Phakakorn,

Director of Human Resources Development Cooperation Division,
Thailand International Cooperation Agency,
Ministry of Foreign Affairs of Thailand

Dr. Thiti Sawaengtham, Deputy Director-General, Department of Health
Distinguished Guests and Participants,
Ladies and Gentlemen,

On behalf of Thailand International Cooperation Agency (TICA), Ministry of Foreign Affairs of Thailand, I am delighted to see you all again in the closing session of the Annual International Training Course (AITC) on Climate Change and Health Adaptation from Climate Change. I would like to extend my congratulations to everyone on the successful completion of the course. Your active engagement has been essential to the success of this course, and I believe that the knowledge and skills you have gained will be invaluable in addressing the health impacts from climate change at local, national, and global levels.

I would also like to express my heartfelt thanks and appreciation to the Department of Health, Ministry of Public Health and all resource persons for co-organizing this course to share valuable knowledge and experiences.

Dear participants,

Over the past few decades, the impacts of climate change have become increasingly apparent. Extreme weather events are likely to become more frequent and more severe as global warming progresses, indirectly affecting public health through negative impacts on the agricultural sector, access to clean water, and the spread of infectious diseases. The effective policymaking and planning, addressing the challenges of climate change and health adaptation from climate change requires a skilled and efficient public health workforce. Public health personnel and relevant agencies should serve as strong role models in disseminating information about the impacts of the climate change and the solutions. This will raise awareness and strengthen the capacity of peoples and communities to deal with the climate change in their respective countries. Consequently, this AITC course is detailed to enhance capacity in climate change and health adaptation.

The success of this course extends beyond these few days and will continue to unfold through your future actions and collaborations. In closing, I wish you all great success in fulfilling your roles in tackle with the Climate Change and Health. Please stay connected with friends to foster cooperation and partnership. Last but not least, don't forget to join TICA Alumni.

Have a safe journey back home. Thank you very much.

Feedback

The Training Course on Climate Change and Health Adaptation from Climate Change was successfully conducted with participation from both onsite and online attendees. Feedback collected from participants indicated a high level of satisfaction with the course. The content was reported to be well-organized, relevant to their professional responsibilities, and effectively delivered. Trainers demonstrated strong subject-matter expertise, and the learning environment was considered conducive to engagement and knowledge sharing.



Key Strengths Identified

Participants highlighted the following strengths of the training program:

- Clear identification and adherence to training objectives
- Relevance and usefulness of the training materials
- Knowledgeable and effective speakers
- Adequate opportunities for discussion and interaction
- Study visits that were well-aligned with the training objectives

Recommended Topics for Future Training

To further enhance the scope and impact of future training sessions, participants recommended the inclusion of the following topics:

- Monitoring and Evaluation (M&E) for HNAP/NAP
- Climate-induced diseases
- Public communication strategies on climate change
- Carbon footprint calculation and its applications
- Risk assessment tools and methodologies
- Proposal development for climate-related funding
- Integration of scientific data and health impact correlation
- Roadmaps for practical implementation of adaptation measures
- Climate-resilient healthcare systems

Areas for Improvement

The following areas were identified for potential improvement:

- Enhance interactive group activities to foster engagement
- Strengthen coordination with the ASEAN Secretariat
- Adhere to the training schedule and ensure timely distribution of materials
- Reduce reliance on online-only training formats
- Address technical issues such as sound quality during virtual sessions
- Incorporate more field visits and showcase local success stories
- Ensure all training materials are available in English
- Simplify visa processing and improve travel logistics for international participants

Additional Comments

Participants expressed their appreciation for the opportunity to attend the training and called for more such initiatives in the future. There was strong emphasis on the importance of continuous learning, practical applications, and strengthening regional collaboration. Many noted that the training greatly improved their understanding of the intersection between climate change and health policy frameworks.





Annex

Annex 1

Agenda

The Training Course on Climate Change and Health Adaptation from Climate Change

17-20 March 2025

Novotel Bangkok Future Park Rangsit, Pathum Thani, Thailand

17 March 2025

08.30 – 09.00

Registration

09.00 – 09.30

Pre test

09.30 – 10.00

Inauguration

- Dr. Thiti Sawaengtham,
Deputy Director-General, Department of Health,
Ministry of Public Health, Thailand
- Mr. Grisada Phakakarn,
Director of Human Resources Development Cooperation Division,
Thailand International Cooperation Agency (TICA)

10.00 – 11.00

Module 1 Overview of Climate Change and Health

by Ms. Faustina Gomez, World Health Organization South-East Asia
Region (WHO-SEARO)

11.00 – 12.00

Module 2 Policy on Climate Change and the Implementation of Health Adaptation Plans

by Mrs. Rosalind Amornpitakpun,
Department of Climate Change and Environment, Thailand

12.00 – 13.00

Lunch Break

13.00 – 14.00

Module 3 Climate Change Health Risk Assessment and Health Impact

by Prof. Dr. Kraichat Tantrakarnapa, Faculty of Tropical Medicine,
Mahidol University, Thailand

14.00 – 17.00

Workshop / Group Discussion Health Impact of Climate Change

by Prof. Dr. Kraichat Tantrakarnapa, Faculty of Tropical Medicine,
Mahidol University, Thailand

18 March 2025

08.30 – 09.00

Recap of Day 1

09.00 – 12.00

Module 4 Health Impacts from Climate-related hazards

- Extreme weather events
- Heat
- Sea level rise
- Air pollution

by Prof. Dr. Kraichat Tantrakarnapa, Faculty of Tropical Medicine, Mahidol University, Thailand

12.00 – 13.00

Lunch Break

13.00 – 16.00

Module 4 Health Impacts from Climate-related hazards

- Vector distribution & ecology
- Water scarcity
- Reduced food production

by Prof. Dr. Kraichat Tantrakarnapa, Faculty of Tropical Medicine, Mahidol University, Thailand

16.00 – 17.00

Q&A

19 March 2025

08.30 – 09.00

Recap of Day 2

09.00 – 11.00

Module 5 Management and Health Risk Communication from Climate Change

by Dr. Atsamon Limsakul, Director of Climate Change Adaptation Research Section, Department of Climate Change and Environment, Thailand

11.00 – 12.00

Module 6 Health and Climate Change Adaptation and Low - Carbon Healthcare Facilities

by Assoc.Prof. Dr. Suthirat Kittipongvises, Sustainable Environment Research Institute, Chulalongkorn University, Thailand

12.00 – 13.00

Lunch Break

13.00 – 14.00

Travel to study trip

14.00 – 17.00

Study Trip at the Thonburi Thawiwattana Hospital, Bangkok

17.00 – 18.00

Travel back to the hotel

20 March 2025

08.30 – 09.00

Recap of Day 3

09.00 – 12.00

Module 7 Health and Climate Change Adaptation Development

by Assoc. Prof. Dr. Alice Sharp, Faculty of Science, Chiang Mai University, Thailand

12.00 – 13.00

Lunch break

13.00 – 14.00

Module 8 Cooperation for Health and Climate Change

by Assoc. Prof. Dr. Alice Sharp, Faculty of Science, Chiang Mai University, Thailand

14.00 – 16.00

Country Experience with Climate Change and Health Policy Implementation and Management

by Department of Health, Ministry of Public Health, Thailand

16.00 – 16.15

Q&A / Post test

16.15 – 16.30

Closing Remarks

- Dr. Thiti Sawaengtham,
Deputy Director-General, Department of Health, Ministry of Public Health, Thailand
- Mr. Grisada Phakakarn,
Director of Human Resources Development Cooperation Division,
Thailand International Cooperation Agency (TICA)



Annex 2

List of Participants

No.	Country	Full Name	Position/Designation	Organization
1	ARMENIA	Ms. Ani Ghukasyan	Senior specialist of Climate Change	Climate Change Department of the Ministry of Environment of the Republic of Armenia
2	BHUTAN	Ms. Deki Pelden	Assistant Environment Officer	Dzongkhag Administration Haa, Department of Environment and Climate Change, Ministry of Energy and Natural Resources
3	BHUTAN	Ms. Tenzin Dema	Assistant Program Officer	Non-Communicable Diseases Division, Department of Public Health, Ministry of Health
4	BHUTAN	Mrs. Ugyen Choeki	Assistant District Public Health Officer	Gasa Dzongkhag Administration, Ministry of Health
5	BRUNEI DARUSSALAM	Ms. Rohhuzaimah Yahya	Public Health Officer	Ministry of Health
6	BRUNEI DARUSSALAM	Ms. Zuliana Zunaidi	Public Health Officer	Ministry of Health
7	CAMBODIA	NY Chamroeun	Officer	Communicable Disease Control Department, Ministry of Health
8	EGYPT	Mrs. Afaf Nasser Mohamed Talaat Soliman	Pharmacist at Climate Change Unit/ Training Officer	General Administration of Environmental Monitoring and Climate Change, Ministry of Health and Population
9	EGYPT	Mr. Ahmed Hassan Amin Farid	Climate Change Team Member	General Administration of Environmental Monitoring and Climate Change, Ministry of Health and Population
10	EGYPT	Mrs. Ensaf Yassin Elsayed Zordok	Member of Climate Change Unit	General Administration of Environmental Monitoring and Climate Change, Ministry of Health and Population

No.	Country	Full Name	Position/Designation	Organization
11	INDONESIA	Mr. Agung Wijaya Subiantoro	Lecturer and Researcher	Universitas Negeri Yogyakarta, Ministry of Education, Culture, Research, and Technology
12	INDONESIA	Mr. Rio Christy Handziko	Lecturer	Universitas Negeri Yogyakarta, Ministry of Education, Culture, Research and Technology
13	INDONESIA	Nur Asni	Staff of Climate Change and Health Adaptation	Directorate of Health Environment
14	INDONESIA	Ms. Aisyah Aminy	Member Environment of Health	Ministry of Health
15	INDONESIA	Dewi Marlina, SKM. MKM.	Staff at the directorate of environmental health, ministry of health	Ministry of Health
16	INDONESIA	Mr. Sandy Dwi Waseso	Staff	Ministry of Health
17	INDONESIA	S.Pd. Siti Arda Mauliti	Policy Analyst	Ministry of health
18	INDONESIA	SKM.M.Kes. Tutut Indra Wahyuni	Work Team Leader climate change adaption	Indonesia
19	INDONESIA	S.Si. Dwi Susilo	Laboratory Technician	National Laboratory for Environmental Health, Ministry of Health Indonesia
20	JORDAN	Mr. Ahmad Ali Mutlaq Al-Burmawi	Director	Environmental Health Directorate, Ministry of Health
21	LIBERIA	Mr. Paul Y S Quimine	National Health and Climate change Coordinator	Ministry of Health
22	LIBERIA	Ms. Keibonic Princess Jalloh	Regional Coordinator	Ministry of Health
23	LIBERIA	Mrs. Veronica C Tarr Geekor	National Coordinator	Ministry of Health
24	MALAYSIA	Mr. Mohd Faiz Bin Itam	Occupational and Environmental Health Officer	Jabatan Kesihatan Negeri Perlis, Malaysia
25	MALAYSIA	Ms. Sharifah Hildah Shahab	Senior Principal Assistant Director	Environmental Health and Climate Change Unit and Occupational Health Unit, Ministry of Health

No.	Country	Full Name	Position/Designation	Organization
26	MALAYSIA	Mrs. Thahirahtul Asma Binti Zakaria	Senior Principal Assistant Director	Environmental Health Unit, Disease Control Division, Ministry of Health
27	Malaysia	Dr. Tan Sin Yew	Public Health Medicine Specialist	Ministry of Health
28	PHILIPPINES	Mr. Romeo JR. Ongpoy	Director III	Department of Science and Technology, Philippine Science High School - MIMAROPA Region Campus
29	PHILIPPINES	Dr. Johnaliz Abarquez Khow	MEDICAL OFFICER III	Department of Health
30	PHILIPPINES	Ms. Laurita Mendoza	Planning Officer IV	Department of Health
31	PHILIPPINES	Engr. Luis Flores Cruz	Supervising Health Program Officer	Department of Health
32	PHILIPPINES	Dr. Sjerlive Clare C. Dioneda	Medical Officer III	Department of Health - Health Emergency Management Bureau
33	SINGAPORE	Mr. Ng Youming	Lead Manager	Ministry of Health
34	SRI LANKA	Mr. Asanka Wedamulla	Medical Officer	Disaster Preparedness and Respond Division, Ministry of Health
35	SRI LANKA	Mrs. Herath Mudiyansele Chathurangani Hiranthika Herath	Medical Officer	Directorate of Environmental Health, Occupational Health and Food Safety, Ministry of Health
36	THAILAND	Mr. Watcharakorn Chuthong	Occupational Medicine Resident	Faculty of Medicine, Chulalongkorn University
37	THAILAND	Ms. Aruniya Chokelap	Public Health Technical Officer, Operational Level	Division of Food and Water Sanitation
38	THAILAND	Ms. Ai-mon Khanmee	Public Health Technical Officer, Operational Level	Division of Food and Water Sanitation
39	Thailand	Mr. Singkorn Phromkhaw	Medical Science Technician, Experienced Level	Division of Food and Water Sanitation
40	THAILAND	Ms. Supaporn Chuenmaung	Public Health Technical Officer, Professional Level	Division of Food and Water Sanitation

No.	Country	Full Name	Position/Designation	Organization
41	THAILAND	Ms. Nawarat Aphichainant	Public Health Technical Officer, Professional Level	Bureau of Environmental Health
42	THAILAND	MR. Pramote Sepsuk	Public Health Technical Officer, Professional Level	Bureau of Environmental Health
43	THAILAND	Ms. Apinya Phuengprayoon	Public Health Technical Officer, Operational Level	Health Impact Assessment Division
44	THAILAND	Ms. Apisaraphon Samarnsap	Public Health Technical Officer, Operational Level	Health Impact Assessment Division
45	THAILAND	Dr. Benjawan Tawatsupa	Public Health Technical Officer, Senior Professional Level	Health Impact Assessment Division
46	THAILAND	Ms. Chanajit Panou	Public Health Technical Officer, Professional Level	Health Impact Assessment Division
47	THAILAND	Ms. Chawisa Kaewson	Public Health Technical Officer, Operational Level	Health Impact Assessment Division
48	THAILAND	Mr. Kanitsorn Kongyen	Public Health Technical Officer, Operational Level	Health Impact Assessment Division
49	THAILAND	Dr. Kirana Dheva-aksorn	Plan and Policy Analyst, Acting as Senior Professional Level	Health Impact Assessment Division
50	THAILAND	Ms. Kornwipa Punnasiri	Public Health Technical Officer, Senior Professional Level	Health Impact Assessment Division
51	THAILAND	Ms. Kulsatree Chatchavalkitkul	Public Health Technical Officer, Operational Level	Health Impact Assessment Division
52	THAILAND	Ms. Naruephon Boorananat	Public Health Technical Officer, Operational Level	Health Impact Assessment Division
53	THAILAND	Ms. Nattawee Loonsamrong	Public Health Technical Officer, Senior Professional Level	Health Impact Assessment Division
54	THAILAND	Ms. Orapan Paekul	Public Health Technical Officer, Professional Level	Health Impact Assessment Division

No.	Country	Full Name	Position/Designation	Organization
55	THAILAND	Ms. Panita Charoensuk	Public Health Technical Officer, Senior Professional Level	Health Impact Assessment Division
56	THAILAND	Ms. Sunisa Maliwan	Public Health Technical Officer, Professional Level	Health Impact Assessment Division
57	THAILAND	Ms. Thanachapa Thanicyongchinpat	Public Health Technical Officer, Operational Level	Health Impact Assessment Division
58	THAILAND	Ms. Rotsathon Plumsut	Public Health Technical Officer, Operational Level	Regional Health Promotion Center 3 Nakornsawan
59	THAILAND	Ms. Kamonchanok Talason	Public Health Technical Officer, Operational Level	Regional Health Promotion Center 6 Chonburi
60	THAILAND	Mrs. Paphavadee Onnom	Public Health Technical Officer, Operational Level	Regional Health Promotion Center 6 Chonburi
61	Thailand	Mrs. Piyamaporn DOUNGMONTRI	Public Health Technical Officer, Professional Level	Regional Health Promotion Center 7 Khon Kaen
62	THAILAND	Ms. Preeyapon Sran-grai	Public Health Technical Officer, Professional Level	Regional Health Promotion Center 8 Udonthani
63	THAILAND	Ms. Suchada Beseku	Public Health Technical Officer, Operational Level	Regional Health Promotion Center 8 Udonthani
64	THAILAND	Ms. Darika Permporn	Public Health Technical Officer, Professional Level	Regional Health Promotion Center 10 Ubon Ratchathani
65	THAILAND	Mr. Chatchanan Pookeaw	Public Health Technical Officer, Professional Level	Regional Health Promotion Center 10 Ubon Ratchathani

Annex 3

Photos of the training

Opening Ceremony



Training Memories





Certificate Awarding Ceremony



**Department of Health, Ministry of Public Health Thailand
Supported by the Thailand International Cooperation Agency (TICA)**

