Capacity-building of national level staff is very important for implementation of health adaptation plans in Member States as well as sustaining them in the long term. While advocacy and awareness on the health impacts of climate change have been created in the last several years, there is a huge need for capacity development of public health professionals to understand the linkages and streamline climate change in public health programmes, strengthening health systems, addressing health issues in the policies and programmes of other sectors and raising health concerns in international climate change negotiations.

WHO-SEARO and WPRO jointly revised and updated a training package on climate change and health. To roll out the training package, the two offices jointly organized a Bi-Regional workshop on Climate Change and Health, Gadjah Mada University, Yogyakarta, Indonesia, 26–30 January 2015.

This report features the proceedings of the workshop that resulted in a clear understanding by all participating countries and Regional Offices of the basic concepts and latest evidence in climate change science and health impact, best practices on adaptation and mitigation measures to reduce climate change, and methods of institutionalizing capacity building programmes at the national level.

“WHO greatly appreciates and thanks GIZ for their contribution in making this Bi-Regional workshop a success. Without GIZ support, the development of the training package and the workshop would not be possible.”
Climate change and health

Report of a bi-regional workshop
Gadjah Mada University, Yogyakarta, Indonesia
26–30 January 2015
## Contents

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Objectives</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Opening session</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Introduction of participants and training programme</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>Technical session 1: Introduction to climate change, understanding the relationship between climate change and health</td>
<td>6</td>
</tr>
<tr>
<td>6.</td>
<td>Technical session 2: Options for responding to climate change, assessing how vulnerable health is to climate change</td>
<td>9</td>
</tr>
<tr>
<td>7.</td>
<td>Technical session 3: Modelling disease and food and nutrition impacts under climate change</td>
<td>13</td>
</tr>
<tr>
<td>8.</td>
<td>Technical session 4: Understanding the impacts of thermal extremes and extreme weather events and health impacts of climate change</td>
<td>17</td>
</tr>
<tr>
<td>9.</td>
<td>Group work – Exercise 1: public health sector response to various climate risks/weather events</td>
<td>22</td>
</tr>
<tr>
<td>10.</td>
<td>Group work – Exercise 2: develop country level action plans for the next year</td>
<td>27</td>
</tr>
<tr>
<td>11.</td>
<td>Evaluation of the workshop</td>
<td>27</td>
</tr>
<tr>
<td>12.</td>
<td>Closing session</td>
<td>30</td>
</tr>
</tbody>
</table>

### Annexes

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Country action plans – SEAR Member countries</td>
<td>31</td>
</tr>
<tr>
<td>2.</td>
<td>Country action plans – WPR Member countries</td>
<td>39</td>
</tr>
<tr>
<td>3.</td>
<td>Agenda</td>
<td>51</td>
</tr>
<tr>
<td>4.</td>
<td>List of participants</td>
<td>52</td>
</tr>
</tbody>
</table>
1. Introduction

Climate change is posing a serious threat to environmental health in addition to the challenges associated with achieving universal health coverage. The Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), published in 2014 gave a grim prognosis for health. These impacts are likely to spread into areas currently unaffected but will most grievously affect those already most exposed to climate-related diseases (the poorest, young and old). The assessment by the Human Health chapter of Working Group II of the IPCC AR5 concluded that climate-related health impacts will emanate from:

- Direct climate or weather impacts on health. Floods are the most common natural disaster affecting the greatest number of people, but improved planning is reducing mortality from floods. The greater risk of death may well come from more intense heat waves and fires, reinforced by the rapid increase in numbers in the most at-risk group, the aged. Extreme high air temperatures contribute both directly and indirectly (through raised levels of ozone and other pollutants) to deaths mainly from cardiovascular and respiratory disease.

- Indirect climate or weather impacts on health linked to human economic activity, mainly:
  - Increased risk of under-nutrition from diminished food production in poor regions. Rising temperatures and variable precipitation are likely to decrease the production of staple foods in many of the poorest regions. Occupational health implications of lost work capacity and reduced labour productivity in vulnerable regions. Health risks increase with the level of activity so agricultural and construction workers are at highest risk.

- Indirect climate or weather impacts on health linked to changes in ecosystems. Of greatest concern are the increased risks of food- and waterborne diseases and vector-borne diseases both
as a result of extreme events and due to longer-term changes in ecosystems. Foremost amongst the food- and waterborne diseases are enteric bacteria and viruses transmitted by the faecal-oral route and naturally occurring bacteria and protozoa.

WHO has an active and long-standing programme on protecting health from climate change, guided by a World Health Assembly resolution (WHA61.19) and the resolution adopted by the Sixty-second session of the Regional Committee for South-East Asia. WHO’s Global Workplan to protect health from climate change was implemented from 2008-2013 with the aim of supporting health systems in all countries, identifying strategies and actions, and sharing knowledge and good practices. WHO also provides the health-sector voice within the overall UN response to this global challenge. While advocacy and awareness on the health impacts of climate change has increased in the last several years, there is an urgent need to develop the capacity of public health professionals to understand the linkages and streamline climate change into public health programmes, increase the decision-making ability of the policy makers, strengthen health systems and address health issues in the policies and programmes of other sectors.

In 2009, WHO-SEARO prepared a training module on climate change and health with technical support from various global experts. This module was prepared for public health practitioners. In 2014, WHO-SEARO jointly with WHO-WPRO and GIZ, and with the support of four experts, revised the training package with new scientific evidence and good practices. A few additional modules were added. The new training package was rolled out at this bi-regional workshop.

2. Objectives

(1) To provide participants with basic concepts and the latest evidence in climate change science and health impacts.

(2) To share various best practices on adaptation and mitigation measures to reduce climate change impacts on health.

(3) To review current capacity in each participating country and to discuss ways to institutionalize capacity building programmes at the national level.
3. Opening session

Dr Nasir Hassan, Team Leader, Environment and Health Unit, WHO Regional Office for the Western Pacific (WPRO) welcomed participants from 16 Member countries of WHO’s South-East Asia and Western Pacific Regions, colleagues from WHO, GIZ and experts. He explained that climate change has become a reality citing the increasing number of extreme weather events that his duty station country Philippines experiences every year. He informed that the participants have a very difficult yet important responsibility that is to learn from the five-day training and further impart their learning to their colleagues in their home country. He said that for the health sector to respond to climate change impacts it is very important to learn from the experience and knowledge of implementers together with global expertise for designing public health intervention programmes.

Ms Payden, WHO-SEARO welcomed the participants and thanked the University of Gadjah Mada for hosting the bi-regional workshop. She mentioned that a review to gauge the capacity of national stakeholders on climate change and health in three countries indicated that there is a huge gap in capacity of the health sector to respond to climate change impacts in health programmes. At the same time, WHO had developed a training package on climate and health in 2009 which needed to be updated. So, WHO-SEARO and WPRO and GIZ joined hands in 2014 to revise the training package and to roll out the first training with the revised package. Four experts developed the training package and a meeting of the experts was held in Gadjah Mada University in June 2014. She informed that the training package that will be presented at the workshop is a product of the hard work of the experts, officials of WHO-SEARO and WPRO and GIZ. She also highlighted the importance of sustaining such training courses and that WHO is exploring with universities to integrate the package into their curriculums.

Ms Ursula Schoch, Adviser, GIZ, thanked GMU for hosting the training. She informed that GIZ provides technical advice and is not a funding agency. The support to the training was given from the global programme on adaptation to climate change in the health sector. This programme is focused mostly on aspects of adaptation which participants will hear about during the workshop. Adaptation and mitigation are key questions in all debates of the UNFCCC processes. She highlighted that the
objectives of GIZ’s global programme is directed towards stronger positioning of health issues in international debate on adaptation to climate change and higher prioritization at national level. It is an opportunity for participants to learn about these topics and to further share the knowledge within their country, organization and ministry. She said that the aim of their global programme is to lower people’s vulnerabilities to the effects of climate change and she hoped that participants will make it a mandate and act on this in their countries. She added that the training package was tested once but it would be useful to get feedback from participants to make final revisions to the manual.

Ms Elena Villalobos, Technical Officer, Climate Change and Health, WHO/HQ congratulated WHO-SEARO and WPRO, GIZ and the experts for the very comprehensive training package and for organizing the bi-regional workshop. She said that the linkage between climate change and health is becoming much clearer and WHO recently published a report on burden of disease due to climate change and it estimates that between 2030-50, there will be an additional 250 000 deaths per year caused by diarrhoea, malaria, heat stress and undernutrition. So WHO is trying to support countries to ensure that the public health system is resilient to climate change. She mentioned that 2015 is a critical year as in December during UNFCCC’s COP 21, an international agreement will determine how countries are going to mitigate climate change and decide how much money will be available to work on adaptation. Another important event is the Sustainable Development Goals which will be decided in September to guide priorities for development till 2030. These decisions will significantly impact countries and it is expected that climate change and environmental health will be key areas of the SDGs.

Prof Dr Adi Utarini, Vice Dean, Faculty of Medicine, Gadjah Mada University (GMU) who inaugurated the workshop, welcomed participants and facilitators and the organizers for holding this important workshop in GMU as well as the expert group meeting to discuss the revision of the training package. She said that GMU is a public university and is the largest and oldest in Indonesia. It’s a comprehensive university consisting of 18 faculties and the faculty of medicine is home to more than 6000 students for graduate and undergraduate programmes with the biggest programme in public health. Therefore the workshop is very important for GMU. Two years ago GMU initiated a partnership with four universities and Heidelberg University of Germany called inter-universities consortium for global health. Participants from the five universities are attending the workshop. She
requested the experts to record key messages on climate and health which will be shared with students of GMU. She thanked Dr Lutfan and team for their efforts in preparing for the workshop.

4. Introduction of participants and training programme

The training was attended by about 50 participants, from ministries of health with a few from ministries of environment, from seven countries of the WHO Western Pacific Region and nine countries of South-East Asia Region. Environmental health focal points from WHO Indonesia, Nepal and Timor-Leste also attended. Training was facilitated by four consultants and technical staff from WHO/HQ, SEARO, WPRO and GIZ.

Ms Payden introduced the training programme. She said that the training package is designed for public health professionals actively involved in the management and decision-making process related to health programmes but also for non-health professionals involved in managing the health challenges posed by climate change. She explained the objectives of the training, set out in Section 2 above, and said that the training package consists of 17 modules:

(1) Introduction to weather and climate
(2) Weather, climate, climate variability and climate change
(3) Population, health and climate change
(4) Policies and practice of mitigation and adaptation
(5) Prediction of the health impacts of climate change
(6) Thermal extremes
(7) Extreme weather events
(8) Vector-borne disease
(9) Water- and foodborne diseases
(10) Food security and malnutrition
(11) Air quality and human health
In order to make the training interactive and engaging, she informed that the five-day workshop would be conducted with a mix of presentations, group activities, panel discussion, poster presentations and field visits.

5. Technical session 1: Introduction to climate change, understanding the relationship between climate change and health

Source: McIver et al. (2014)
The figure illustrates the various exposure pathways by which climate change affects health, with a particular focus on the Pacific, although the pathways are the same in other regions.

Four modules were presented in this session. The presenters and key messages from each module are shown below:

Module 1: Introduction to climate, weather and health (Dr Kristi Ebi)

- There is a growing body of scientific evidence to show that climate is changing.
- Humans are a major source of the greenhouse gas emissions that drive climate change.
- The changing weather patterns resulting from climate change can affect human health trends.
- The health sector has a role nationally and internationally in preparing for, preventing, and coping with the health risks of climate change.

Module 2: Weather, climate, climate variability and climate change (Dr Kathryn Bowen)

- It is important to know the difference between weather and climate, climate variability and climate change.
- Deal with climate change consequences now. Don't be preoccupied with climate change itself – think of how to manage consequences based on risk factors (hazard, vulnerability and exposure).
- There are many current and future consequences of climate change, including sea-level rise, extreme weather events such as floods and cyclones, and droughts.

Module 3: Population health and climate change (Dr Kathryn Bowen)

- The health impacts of climate change will be felt by everyone, everywhere. Climate change does not respect borders.
- People will feel the effects of climate change differently, depending on where they live. Some places will experience...
changes such as increasing intensity of cyclones while others may experience longer-term changes such as drought.

➢ Climate change will exacerbate current and underlying burdens of disease. It will not bring anything remarkably new or different, rather it will worsen current health issues such as undernutrition, diarrhoeal disease, and infectious diseases.

➢ Climate change will impact on health in the Asia Pacific region in a variety of ways, including more frequent and intense extreme weather events – such as storms/cyclones/floods, an increase in the number of hotter days, and sea-level rise.

➢ Without adaptation and mitigation climate change could result in a dramatically increased health burden in the regions.

➢ Public health needs to incorporate a greater understanding of climate change in its policies and programmes.

➢ Public health researchers and practitioners have a major role to play in the global response to health and climate change.

Module 15: United Nations Framework Convention on Climate Change (UNFCCC) (Ms Elena Villalobos)

➢ UNFCCC is an international process for negotiating agreements on climate change.

➢ A series of agreements have been reached on promoting adaptation, including establishing international funding for adaptation.

➢ Health has been poorly represented in the agreements and adaptation funding and so there is urgent need for the health sector to engage actively in these negotiations.

➢ The Intergovernmental Panel on Climate Change (IPCC) provides comprehensive scientific assessments to inform the negotiations.

**Feedback from participants on the presentations in technical session 1:**

Participants shared some observations from their countries. Kathmandu was colder 60 years ago and malaria and dengue were not prevalent then, now
these diseases are prevalent all across the country. Timor-Leste experiences six months of dry and rainy season, now the rainy season has increased and more cases of dengue are reported. Indonesia experiences erratic weather with drought and floods. Nepal experiences shorter rainy days with higher intensity.

6. Technical session 2: Options for responding to climate change, assessing how vulnerable health is to climate change

Four modules were presented in this session. The presenters and key messages from each module are shown below:

Module 12: Assessing health vulnerability (Dr Kristi Ebi)

- Vulnerability is the propensity to be adversely affected and may include sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

- The health impacts of climate change will be inequitably distributed within and between countries, so it is important to improve understanding of communities’ differing levels of vulnerability in order to prioritize limited resources to the most vulnerable. Without this prioritization it is almost impossible to design responses that meet the needs of communities.

- There are many causes of vulnerability ranging from biological characteristics of organisms to the terms of international trade.

- The many facets of vulnerability mean there is a correspondingly wide range of opportunities for intervention at various levels.
Many of the causes of vulnerability to climate change make individuals and populations susceptible to other environmental threats as well. As a result, interventions to reduce vulnerability to climate change will bring other benefits, and these will very likely be evident before the full impact of climate change is apparent.

Module 4: Policies and practice of mitigation and adaptation (Dr Kristi Ebi)

- There are two ways to respond to climate change - through mitigation and adaptation.
- Many mitigation and adaptation activities are relevant to the health sector.
- There is a strong need for the health sector to influence mitigation activities in other sectors as many activities will have a positive impact on health. For example, if emissions are reduced (mitigation), the health of the population is improved (co-benefits/win-win).
- The health sector plays an important role in adaptation but it requires multisectoral collaboration.

Module 14: Mitigation and co-benefits (Dr Nasir Hasan)

- Given our rapidly increasing greenhouse gas (GHG) emissions, we need to focus on ways in which we can reduce (and, ideally, reverse) this trend.
- The health sector can be more involved in this conversation, particularly through demonstrating climate change mitigation and health activities to be ‘win-win’ projects with co-benefits. It is also important for the health sector to reduce its own emissions, by greening hospitals and other health care facilities for example.
- It would be useful to know the sort of co-benefits projects that are currently being implemented to see to what extent these can be incorporated in our own contexts and in particular, how we can scale these up.
Module 13: Adaptation (Ms Elena Villalobos)

- Robust health systems are essential for adaptation. Indeed, strong health systems are essential for most responses to be effective, whether that is in relation to an infectious disease outbreak, such as Ebola in 2014, or to respond to a natural event like an earthquake or tornado. Here again we can see the strength of the ‘win-win’ argument – i.e. if we invest in health systems, then this is effectively investing in a whole range of health-relevant responses, including risks from climate change.

- It is very important to develop climate-resilient health systems that can bounce back, and perhaps even transform, after a weather event such as a storm or flood. In the long-run, supporting climate-resilient health systems that can respond effectively to such threats, is a sustainable approach which saves money, time and lives.
The figure summarizes the components necessary for integrating the Health National Adaptation Plan (HNAP) within the overall NAP process. It highlights that the HNAP needs to work directly with operational levels within health systems.

**Feedback from participants on the presentations in technical session 2:**

Health vulnerability and adaptation assessments (V&A) have been done in Bhutan for two climate-sensitive diseases (dengue and malaria) to identify vulnerable populations and develop measures to reduce risk from these diseases. Sectors like hydro-meteorology, water and environment were involved in the process. Maldives has done a V&A for preparing inputs for national communications to UNFCCC. Philippines has recently developed a V&A tool and the Ministry of Health and Ministry of Planning will be conducting the V&A. In Indonesia, V&A has been done in three cities in 2010 for vector-borne and diarrhoeal diseases. Bangladesh, Cambodia, and Nepal have also conducted V&A.

Mitigation activities have been launched in various countries:

- Ministry of Health in Timor-Leste has introduced car-free Sundays;
- Ministry of Environment in Maldives has introduced solar panels and extra-large windows to get natural light into buildings;

Department of Public Health in Thailand launched the Green and Clean hospital project in 2010. An example of best practice is the 17th Somdej Phrasangkharaj Hospital in Suphanburi. This is a 250-bed hospital that serves 1000 patients every day (200 inpatients and 800 outpatients). The hospital has won national and international awards for its innovative programmes involving all departments. In 2011, the hospital reduced emissions of carbon dioxide by 13.7% or 252 tons, which is the equivalent of planting 28 000 trees. The actions taken also resulted in a healthier workplace, winning a popular vote award on Health Environment in 2012.

Bhutan shared an example of their health and climate change adaptation project. This is a surveillance project where climate-sensitive disease data is collected at a health centre, which is then correlated with weather data. The project is conducting climate sensitivity analyses, with a focus on temporal and spatial analyses and vulnerability mapping (risk mapping). Eventually, the project aims to develop predictive models, issue risk warnings, and develop a response plan.

7. **Technical session 3: Modelling disease and food and nutrition impacts under climate change**

Two modules were presented and a panel discussion was held in this session. The presenters and key messages from each module and the panel discussion are shown below:

Module 5: Prediction of the health impacts of climate change (Dr Hae-Kwan Cheong)
For public health, observational studies (based on time- and space-specific relationships between health effect and climate factors) are common sense, transparent and provide good insight. Episode analysis (like the London heat wave) and seasonality analysis (like cholera in Bangladesh) are good examples.

While time-series and spatial studies (most commonly regression analysis) are the principal methods of analyzing the climate-relatedness of a specific health outcome their use in public health response is not clear at this stage.

It is important to note that while episode analysis has benefits, weather-health relationship analysis is only a basic step for climate-related health effects and does not necessarily represent true climate effect on health.

Modelling is a useful tool for providing insights into the future and indicative estimates of future impacts but they do not predict.

Module 10: Food security and malnutrition (Dr Kathryn Bowen)

Nutrition is already a serious health problem: MDG5 (child mortality) will not be reached – 35% of child deaths are due to malnutrition (Black et al., 2008).

Food security is already a significant challenge and climate change will worsen it.

It is possible to mitigate food production through change in technology, governance, economic, legal, and cultural (habitual) as well as mitigating climate change.

Panel discussion moderated by Dr David Sutherland

The panel discussion looked at the perception of public and government on health impact of climate change, the support from government for addressing the issues and how adaptation measures are chosen. The panelists were:

Ms Rada Dukpa, Ministry of Health, Bhutan
Dr Ann Natallia Umar, Ministry of Health, Indonesia
Climate change and health

- Ms Astutie Widyarissantie, Ministry of Environment, Indonesia
- Ms Aminath Shaufa, Health Protection Agency, Maldives
- Mr Rolando I. Santiago, Department of Health, Philippines
- Ms Victoria Ieremia Faasili, Ministry of Health, Samoa

Summary of the panel discussion:

Question 1: What are public and government perceptions of climate change impact on health?

- Government perception seems to be higher than among the general population. A review done in Bhutan shows that awareness among officials on the health impact of climate change among various sectors such as agriculture, environment and water are good while it may not be the same among the public.

- In Indonesia there is national-level coordination to ensure that adaptation and mitigation are taken up by all sectors. This relates to the high commitment at the central level to address climate change impacts. Public awareness relates mostly to disasters and their impact on health.

- In Maldives, the government has given high priority to climate change as small islands are very vulnerable. Both the Ministry of Environment and Ministry of Health are working to reduce impacts of climate change. It was noted that public perception may not be very strong.

- In Samoa, public awareness is very high due to awareness campaigns by the government on adaptation over the last five years. Vulnerable areas have been identified.

- The main drivers for such initiatives are international fora and global level commitments.

Question 2: How is your government responding to climate change in terms of financing, resources and awareness-raising?

- Some countries have allocated funds for climate change but these are not specifically for health adaptation.
It is being done in different ways but governments are making serious attempts at funding responses to climate change. In Samoa, the government has set up a climate trust fund. The Ministry of Environment, Forests and Climate Change in India has directed all ministries to raise funds for climate change.

Several countries have received donor funds and they are further creating facilities for attracting international funding responses. Bhutan has received GEF funds for a five-year health adaptation project while Maldives has received some funds from UN to develop a low-emission and climate-resilient island. Bangladesh has received government as well as donor funds for adaptation in various sectors including health.

Question 3: How do you choose adaptation measures? Different for different vulnerable groups?

Current practice seems to be to respond to circumstances/events dealing often with single issues (e.g. water resources/supply) but some countries are being more strategic in the way that they identify adaptation measures.

Bhutan has developed some adaptation measures based on hazards and risks identified in the V&A. For example, glacial lake outburst flood (GLOF) early warning system and preparedness plans have been developed for riverine communities. The country has also developed a spring water revival technology which has been piloted in a few spring sources that were drying up.

Indonesia has developed specific measures for urban and rural areas based on the V&A assessment.

In Samoa, 13 sectors were assessed and nine were found to be vulnerable including health. Further sector-wise V&A assessments will be carried out and adaptation measures developed. A climate change and health strategy has been endorsed by the government.

There was unanimous agreement that more adaptation options (systems, technology, etc.) are required.
Question 4: Is there a forum or mechanism for bringing together meteorology/health data to analyse risks and impacts?

- Some work is being done in this area. For example, Bhutan is piloting collection of health data and meteorological data (rainfall, humidity and temperature) by health workers of basic health units in five districts. Generally, there is lack of collaboration between health and meteorological services in many countries and there is need for establishing such integration.

- Data may either be in public domain or available only upon request so there are mixed levels of opportunity to use and analyze data.

8. **Technical session 4: Understanding the impacts of thermal extremes and extreme weather events and health impacts of climate change**

Six modules were included in this session. Three modules were presented on the morning of day four and three on the morning of day five. In between, on the afternoon of day four, participants visited Dr Sardjito General Hospital to learn about the disaster working group who work on preparedness and disaster response in Indonesia. The working group was involved in the response to the 2007 flooding in Jakarta and landslide in Banjarnegara, Central Java in 2014. The group conducts simulation exercises to keep updated on the various elements of disaster preparedness and response.

Module 6: Thermal extremes (Dr Kristi Ebi)

- Climate change is projected to increase health risks by more frequent, severe and longer heat waves as well as increasing numbers of at-risk groups.

- Larger and older populations could be at increased risk for additional adverse health impacts.

- What is extreme in one location is not necessarily extreme elsewhere, hence the need for local definitions of what constitutes an extreme event.
Adaptation can reduce current and future risks. Successful early warning and response requires:
- collaboration between health/met services/implementing agencies;
- clarity of advice on actions to take and avoid;
- awareness of who and where are the most vulnerable;
- different options for heat relief; and
- creating staff resources – short-term assignments.

Module 8: Vector-borne diseases and climate change (Dr Luftan Lazuardi)

- Climate change could affect vector-borne diseases in humans – diseases of most concern are malaria, dengue, encephalitis and Lyme disease.
- Climate change effects on vector-borne diseases are quite complex:
  - Temperature/precipitation/humidity – some positive/some negative impacts, some direct/some indirect and dependent on several factors (reservoirs, vectors, humans etc.);
Climate change and health

- increased range or abundance of reservoirs and/or vectors and enhanced transmission;
- seasonal/daily patterns of behaviour.

- Impacts are location-specific so location-specific surveillance and response is required.
- Impacts may include unanticipated pathogens.
- Vector control and health departments often work alone.
- Responses are adaptation, not mitigation, and relate to health systems (strengthening surveillance, precautionary approach, mainstreaming response to disease threats, enhancing health system capacity, anticipating new/emerging pathogens).

Table 11-1 | The association between different climatic drivers and the global prevalence and geographic distribution of selected vector-borne diseases observed over the period 2008-2013. Among the vector-borne diseases shown here, only dengue fever was associated with climate variables at both the global and local levels (high confidence), while malaria and hemorrhagic fever with renal syndrome showed a positive association at the local level (high confidence).

<table>
<thead>
<tr>
<th>Disease</th>
<th>Area</th>
<th>Cases per year</th>
<th>Climate sensitivity and confidence in climate effect</th>
<th>Key references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosquito-borne diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Malaria</td>
<td>Mainly Africa, SE Asia</td>
<td>About 220 million</td>
<td></td>
<td>WHO (2008); Kelly-Hope et al. (2009); Alonso et al. (2011); Omumbo et al. (2011)</td>
</tr>
<tr>
<td>Dengue</td>
<td>100 countries, esp. Asia Pacific</td>
<td>About 50 million</td>
<td></td>
<td>Bolle (2009); Pham et al. (2011); Astrom et al. (2012); Earnet et al. (2012); Desclaux (2012)</td>
</tr>
<tr>
<td>Tick-borne diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tick-borne encephalitis</td>
<td>Europe, Russian Fed., Mongolia, China</td>
<td>About 10,000</td>
<td></td>
<td>Tukvanchi et al. (2011)</td>
</tr>
<tr>
<td>Lyme</td>
<td>Temperate areas of Europe, Asia, North America</td>
<td>About 20,000 in USA</td>
<td></td>
<td>Bennett (2000); Ogden et al. (2008)</td>
</tr>
<tr>
<td>Other vector-borne diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hemorrhagic fever with renal syndrome (HFRS)</td>
<td>Global</td>
<td>0.15-0.2 million</td>
<td></td>
<td>Fang et al. (2010)</td>
</tr>
<tr>
<td>Plague</td>
<td>Endemic in many locations worldwide</td>
<td>About 40,000</td>
<td></td>
<td>Sterns et al. (2006); Ari et al. (2010); Xu et al. (2011)</td>
</tr>
</tbody>
</table>

Module 9: Water- and foodborne diseases (Dr Hae-Kwan Cheong)

- Waterborne diseases are mostly faecal-oral transmitted diseases. Diarrhoea is underreported.
- Climate can influence waterborne diseases in different ways depending on the local environment and population.

Mitigation and adaptation will be enhanced by understanding the ecology of pathogens (need to understand cause of diarrhoea better).

Module 11: Air quality and human health (Ms Payden)

- Air pollutants produced by burning fossil fuels and by wildfires can adversely affect human health, both directly and indirectly (from impact on plants and pollen). Key pollutants are carbon monoxide (CO); nitrogen dioxide (NO2); lead (Pb); sulfur dioxide (SO2); particulate matter (PM2.5, PM10); ozone (O3).
- Climate change influences air quality and there is strong evidence for causal relationship between air pollution and premature death. The pollutants most closely linked with climate change are ozone and particulate matter.
- Reducing the sources of air pollution would prevent avoidable premature mortality. This can be achieved by policies and investments supporting cleaner transport, energy-efficient housing, power generation, industry and better municipal waste management.
- Key rural and peri-urban air pollution sources can be reduced by decreasing outdoor emissions from household coal and biomass energy systems, agricultural waste incineration, forest fires and certain agro-forestry activities (e.g. charcoal production).

Module 7: Extreme weather events (Dr Kristi Ebi)

- Extreme weather events are already a significant health risk (storms and flooding especially) in South-East Asia and the Western Pacific regions and climate change is increasing their frequency and/or severity.
- The main factors influencing scale of impact are nature and severity of the event, vulnerability and exposure, although for exposed and vulnerable communities even non-extreme events can have extreme impacts.
- Children are particularly vulnerable but also the older, chronically sick, unfit/immobile, physically/mentally impaired, socially isolated and poorest people.
How the health risks of extreme events could change with climate change is currently uncertain but uncertainty is not a reason to not take action.

Changes in factors other than climate change will be critical in determining the nature and extent of future risks.

Effective preparation can significantly reduce current and future risks under a changing climate.

Module 16: Disaster risk management (Dr Kristi Ebi)

Disaster risk management (DRM) is a structured process for increasing resilience. It is a key process under the Hyogo Framework for Action with strategic goals for DRM of:

- more effective integration of disaster risk into sustainable development policies, planning and programming at all levels;
- develop and strengthen institutions, mechanisms, and capabilities to build resilience to hazards; and
- systematic incorporation of DRM approaches into the implementation of emergency preparedness, response and recovery programmes.

The diagram highlights differences and overlap between climate change adaptation and disaster risk response.
9. **Group work – Exercise 1: public health sector response to various climate risks/weather events**

The participants split into four groups. The first group looked at typhoons, cyclones and sea level rise, the second group looked at flood, drought and rainfall extremes, and the third group discussed response to glacial lake outburst floods (GLOF) and the last group took up temperature extremes.

Group suggestions were as follows:

**Group 1** (members from Cambodia, Indonesia, Philippines, Viet Nam and Samoa) proposed five strategic areas of response to *typhoons, cyclones and sea level rise*:

- **Health governance, policy and management**
  - Establish or strengthen climate change and health coordination units within the Ministry of Health (these units coordinate and monitor implementation of the work programme).
  - Revise the TOR for communicable diseases control committee (CDCC) to reflect climate change and health.
  - Review health legislation and policies to assess gaps in terms of adaptation needs for typhoon/cyclone/sea level rise.
  - Regular update of Health Sector Disaster Management and Response Plan to ensure typhoon/cyclones and sea level rise are reflected. Include regular drills and tests.
  - Regular updates of contacts and inform relevant partners.
  - Coordinate the collation of all existing databases and information systems related to climate change and health for more coordinated interventions.
  - Develop monitoring and evaluation tools/mechanisms with a minimum set of core indicators for typhoon/cyclone/sea level.
Cross-sectoral collaboration and partnership

- Facilitate within-sector and between-sector understanding of the impacts of climate change and health in order to prevent and manage climate change health disasters.
- Develop/strengthen the climate early warning system and integrate environmental and health data into this warning/information system.
- MOH and service providers connected to climate early warning system using existing networks: (twitter, facebook, emails, texting etc.)

Capacity development

- Provide continuous training to strengthen understanding on climate early warning systems.
- Regular community capacity building on climate change and health issues by distributing IEC materials and risk communications.
- Conduct regular refresher courses for health sector staff on climate and health.
- Train media in relation to health advocacy programmes for typhoon/cyclones and sea level.
- Train staff on mental health management, post-traumatic disorders/stress.

Vulnerability and adaptation assessment

- Develop a climate health assessment tool to easily monitor the vulnerability and adaptation assessment.
- Work in collaboration with other sectors in conducting vulnerability and capacity adaptation assessments for typhoons, cyclones or sea level rise.
Risk management

- Collaborate with relevant organizations for the prevention and management of diseases that may be caused by typhoons, cyclones and sea level rise.
- Continuous sharing of information across sectors (e.g. zoonotic diseases).

**Group 2** (members from Bangladesh, Indonesia, Lao PDR, Maldives, Sri Lanka and Thailand) proposed the following health sector actions for **flood, droughts and rainfall extremes**:

**Adaptation measures in health sector**

- Development of health early warning system.
- Strengthening disease (both communicable and non communicable) surveillance systems and integrate with meteorological monitoring systems.
- Build capacity at national and sub-national levels.
- Empower communities and build resilience to climate-induced weather events.
- Map the risk-vulnerable populations and existing adaptive capacity.
- Develop health promotion and public education programmes for health preparedness and response to these weather events.
- Develop actions for different administrative levels – national, sub-national, district and community.

**Further areas of work**

- Enhancing coordination between health and other sectors such as meteorology, disaster management, environment, water and sanitation.
- Strengthening disease surveillance.
- Establishing a data portal in Ministry of Health with inputs from other departments.
Establish a Disaster Management Unit (health only) from national to sub-district level.

More research on health impacts of flood, drought and rainfall.

Inclusion of climate and health in school curriculum.

Group 3 (members from Bhutan and Nepal) reviewed past GLOF events, their impacts and proposed some actions:

Current adaptation measures

- Current adaptation measures to reduce GLOF risks are hazard zoning, lowering water levels of high risk glacial lakes, relocating vulnerable settlements and an early warning system to inform downstream communities in case GLOFs occur. There is no specific adaptation measure currently in the health sector.

Institutional arrangements

- The main institutions for coordinating GLOF risk reduction are in the Ministry of Home Affairs, the Central Disaster Management Committee, and the Department of Hydrology and Meteorology in Nepal. In Bhutan, the responsibility lies with the Ministry of Home and Cultural Affairs, National Disaster Committee, District Disaster Committee, and local disaster committees.

Surveillance and information management

- Monitoring stations and early warning system sirens are installed which are activated for evacuating communities.

- In post-GLOF situations, a rapid health assessment tool is available to assess health impacts of affected communities and identify the response needed for outbreaks and injuries. The health assessments are linked to the health management information system.

Proposed new actions in the health sector

- Strengthen preparedness and responsiveness of health facilities in the GLOF areas through staff capacity development (on emergency management), resilience of infrastructure and basic
services and stocking of medical and communication equipment, drugs etc.

- Strengthen mental health programmes in health centres to provide counselling to affected population and health workers.
- Enhance public awareness about health impacts of GLOFs and their preparedness for such events.

**Group 4** (members from India, Indonesia, Timor-Leste, Papua New Guinea and Tuvalu) deliberated on **extreme temperatures**, their potential health impacts and preventive actions.

**Institutional set up**

- Identify a focal department within the Ministry of Health such as a Health Crisis Centre and identify expert groups to support vulnerability mapping and preparation and implementation of adaptation measures.
- Strengthen primary health centres and community empowerment to take up adaptive actions.

**Surveillance and information management**

- There is need to collaborate with meteorology agencies and link with disease surveillance systems in all regions.
- Develop computer-based information collection systems and train health professionals in data analysis, dissemination of information and to use for policy changes and implementation.

**Measures that the health sector could undertake**

- Adjust working hours during thermal extremes.
- Standardize building design material to be sensitive to temperature.
- Develop green hospitals (energy efficient devices, proper waste management disposal).
- Lifestyle (individual diet, avoid exposure to extreme heat by rescheduling working hours and wearing appropriate clothing).
10. **Group work – Exercise 2: develop country level action plans for the next year**

The action plans developed are to be implemented by countries and supported by WHO and other partners wherever relevant and possible. The detailed country plans are in Annex 1. Participants have generally planned for actions in these strategic areas:

- Strengthening organizational structure for climate change and health at different levels of governance, such as setting up a national level coordination team to collaborate with various line ministries. This is needed to implement both adaptation and mitigation measures to reduce health impacts of climate change.
- Building capacity of health personnel and other sectors by organizing national-level training on climate change and health.
- Increasing resilience of general population in combating climate-sensitive diseases through awareness and capacity development activities.
- Strengthening health systems using WHO guidance on building health system resilience to climate change.
- Strengthening information and surveillance by conducting health vulnerability and adaptation assessments and developing integrated disease and meteorology surveillance and research.

11. **Evaluation of the workshop**

To measure the effectiveness of the training package, a questionnaire consisting of 16 technical questions covering the entire training package was prepared. A pre-test on the first day and post-test on the last day was also conducted with 31 participants taking part in both tests. (Those who took part in only one of the tests were excluded from the analysis.) The aggregate mark for each question is shown in graph 1. There is clearly
significant improvement in participant understanding by the end of the training, although questions related to modules 4 and 11 were most challenging. When finalizing these modules every effort will be made to make points simpler and clearer to ensure that future participants understand them better.

Graph 2 demonstrates marks obtained by each participant. There is significant improvement after the training which indicates that the participants’ knowledge increased with the training.

**Graph 1 – Pre test and post test – Average scores per question**

**Graph 2 – Pre-test and post-test scores by 31 participants (16 questions)**
To get feedback on the overall effectiveness of the workshop, participants were asked to fill in an evaluation form. Thirty participants took up the evaluation. The results are captured in graph 3 and 4. Generally participants were very satisfied with the overall content and facilitation of the workshop. A few areas such as seating arrangements and site visit needed improvement. These are noted and ideas for improving such aspects will be included in the trainers’ guide and addressed in future workshops.

**Graph 3 – Evaluation results for effectiveness of workshop**

**Graph 4 – Evaluation results for organization of workshop**
12. Closing session

Ms Ute Jugert, GIZ presented certificates of attendance to participants and certificates of appreciation to the facilitators.

Each country prepared action plans for the next year (contained in Annex 1). SEARO and WPRO officials will follow up with the countries to finalize and implement the action plans. Detailed notes of the 17 modules were taken and these will be used to further improve the training package. The package will be finalized in 2015 and will be available to interested agencies to use in national or sub-national-level training programmes.
## Annex 1

### Country action plans – SEAR Member countries

**Bangladesh**

<table>
<thead>
<tr>
<th>SL No.</th>
<th>Actions</th>
<th>Time frame</th>
<th>Implementing agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To undertake studies on climate change impacts on health and share information to understand how to mitigate climate-related health risks</td>
<td>January – June 2015</td>
<td>Ministry of Health &amp; Family Welfare/ Ministry of Environment &amp; Forest</td>
</tr>
<tr>
<td>2</td>
<td>To strengthen institutional capacity to achieve adaptation and mitigation goals</td>
<td>January – December 2015</td>
<td>MoH&amp;FW</td>
</tr>
<tr>
<td>3</td>
<td>To arrange a workshop on CC impacts on health to develop a sustainable adaptation and mitigation plan involving experts, civil society, NGOs, stakeholders</td>
<td>January 2015</td>
<td>MoH&amp;FW</td>
</tr>
<tr>
<td>4</td>
<td>Develop/disseminate awareness raising programmes &amp; learning materials to educate and sensitize a larger number of stakeholders including health, other relevant professionals, public representatives, community and religious leaders</td>
<td>January – December 2015</td>
<td>MoH&amp;FW</td>
</tr>
<tr>
<td>5</td>
<td>To engage MoH&amp;FW in decision making process while preparing demands for adaptation and for mitigation funds nationally and globally as an important stakeholder</td>
<td></td>
<td>MoH&amp;FW</td>
</tr>
<tr>
<td>6</td>
<td>To extend hospital and clinical facilities up to village level (primarily far-flung flood &amp; drought areas)</td>
<td>January – December 2015</td>
<td>MoH&amp;FW/MOF</td>
</tr>
<tr>
<td>7</td>
<td>To create a data portal to forecast outbreak of climate change-related vector- and waterborne diseases for facilitating precautionary measures</td>
<td>January 2015</td>
<td>MoH&amp;FW/MOE&amp;F/MOD</td>
</tr>
</tbody>
</table>
**Bhutan**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Activity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>To enhance capacity of health sector, relevant sectors and communities on climate change and health risks</td>
<td>Train officials from climate-sensitive programmes in public health and district health workers (ToT) on climate change and health risks using the module</td>
<td>WASH Vector control Emergencies Nutrition</td>
</tr>
<tr>
<td></td>
<td>Train other officials from relevant sectors including local govt.</td>
<td>NEC, Agriculture, disaster</td>
</tr>
<tr>
<td>Develop climate change and health strategy</td>
<td>Enhance communication and develop strategic framework for climate change and health</td>
<td>TA to review the document and finalize</td>
</tr>
<tr>
<td>Risk assessment and strengthen Early Warning System (EWS)</td>
<td>Develop vulnerability index /mapping of health outcomes</td>
<td>TA required</td>
</tr>
<tr>
<td></td>
<td>Work further and develop EWS on identified CSD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expand integrated surveillance to other health facilities</td>
<td></td>
</tr>
<tr>
<td>Conduct research and improve evidence</td>
<td>Collate temperature data and link with health outcomes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Collate air quality data and link with health outcomes</td>
<td></td>
</tr>
</tbody>
</table>

**India**

**Rationale**

The issue of global warming and its consequences has long been identified and mitigation measures have been initiated by Member countries. Recently, the issue of an increase in climate-sensitive diseases has come up for consideration by Member countries. In recent years extreme events like heavy rains, sea storms, flood, droughts, heat waves, cold waves, forest fires, etc. have increased. There is convincing evidence that climate-sensitive diseases like VBDs, DDs, RTIs, heat and cold wave issues are attracting the attention of the programme managers.
Objectives
To establish a climate change and human health related programme in the Ministry of H&FW for planning and implementation of adaptation measures to support combating climate-sensitive diseases in the country.

Strategies
- Assess the vulnerability and capabilities to handle issues related to climate and health.
- Develop capacity of the existing health care providers for responding to the health problems due to climate change.
- Establish system of surveillance, monitoring and early warning.
- Strengthen public health programmes and health facilities to handle new health threats because of climate change.
- Organize IEC activities for creating awareness among all concerned.
- Initiate research projects and review best practices for consideration in the country.
- Project a budgetary provision for implementation of the new programme activities.

Workplan for implementation

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Time frame in months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-6</td>
</tr>
<tr>
<td>Sl 1 Submitting project proposal</td>
<td>x</td>
</tr>
<tr>
<td>Sl 2 Sanction of the project</td>
<td></td>
</tr>
<tr>
<td>Sl 3 Preparing action plan for implementation</td>
<td></td>
</tr>
<tr>
<td>Sl 4 Implementation of project activities</td>
<td></td>
</tr>
<tr>
<td>Sl 5 Review implementation periodically</td>
<td></td>
</tr>
<tr>
<td>Sl 6 Mid-term assessment</td>
<td></td>
</tr>
<tr>
<td>Sl 7 Final assessment</td>
<td></td>
</tr>
<tr>
<td>Sl 8 Budget assessment &amp; utilization</td>
<td>x</td>
</tr>
<tr>
<td>Sl 9 Monitoring implementation of activities</td>
<td></td>
</tr>
</tbody>
</table>
### Indonesia

<table>
<thead>
<tr>
<th>Proposed activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Strengthening national coordination, inter-ministry and inter-programme</td>
</tr>
<tr>
<td>2. Updating NEHAP</td>
</tr>
<tr>
<td>3. Updating of media campaign relevant to climate change and health, such as: booklet, flyer, TV campaign, radio</td>
</tr>
<tr>
<td>4. Expand research activities including field trials: ongoing process on health impact surveillance system (early warning system), health impact of climate change, vulnerability assessment of health impact of climate change, operational research about health impact adaptation options (for malaria, dengue, diarrhoea, influenza-like illness, pneumonia).</td>
</tr>
<tr>
<td>5. Enhance capacity building (e.g. advocacy, training, workshops, regional and global exposure through meetings etc) for policy makers and practitioners, medical staff, community.</td>
</tr>
<tr>
<td>6. Finalize framework for convergence of CCA and DRR</td>
</tr>
<tr>
<td>7. Strengthening health system in terms of number of health facilities, human resources, community empowerment, policy development</td>
</tr>
</tbody>
</table>

### Maldives

<table>
<thead>
<tr>
<th>Proposed activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A desk review of the climate-related work done by different stakeholders, and their awareness of the health impacts related to climate change.</td>
</tr>
<tr>
<td>2. Develop the health vulnerability and adaptation assessment tool and make a vulnerability mapping.</td>
</tr>
<tr>
<td>3. Capacity building of public health staff on vulnerability and adaptation assessments and intervention measures of community health workers in the public health units (atolls).</td>
</tr>
<tr>
<td>4. Develop an integrated disease surveillance and meteorological data base at national level.</td>
</tr>
<tr>
<td>5. Capacity building of public health staff (atolls) on vector surveillance and integrated vector management.</td>
</tr>
<tr>
<td>6. Develop a guideline for greening hospitals.</td>
</tr>
<tr>
<td>7. Conduct a study to see the association between dengue and rainfall (national) / air pollution and respiratory and heart diseases (Male’ city).</td>
</tr>
</tbody>
</table>
Nepal

<table>
<thead>
<tr>
<th>Sl</th>
<th>Activities</th>
<th>Responsibility</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Conduct training on public health and climate change for officials of MoHP at central level</td>
<td>MoHP and WHO</td>
<td>Sept. 2015</td>
</tr>
<tr>
<td>2</td>
<td>Dissemination of V &amp; A assessment report to health professionals</td>
<td>MoHP and WHO</td>
<td>April 2015</td>
</tr>
<tr>
<td>3</td>
<td>Development of proposal for piloting of one government hospital as green hospital</td>
<td>MoHP and WHO</td>
<td>Oct. 2015</td>
</tr>
<tr>
<td>4</td>
<td>Publication of IEC materials on climate change and health</td>
<td>MoHP</td>
<td>Dec. 2015</td>
</tr>
<tr>
<td>5</td>
<td>Situation assessment of health facilities near GLOF areas</td>
<td>MoHP and DHM</td>
<td>Dec. 2015</td>
</tr>
<tr>
<td>6</td>
<td>Training on protection from cold wave effects for health officials from cold-wave prone areas</td>
<td>MoHP</td>
<td>Dec. 2015</td>
</tr>
<tr>
<td>7</td>
<td>Observation tour for health officials to be familiar with best health adaptation practices</td>
<td>MoHP and WHO</td>
<td>August 2015</td>
</tr>
</tbody>
</table>

Sri Lanka

**Proposed activities**

1. Close monitoring and evaluation of the current programme with the disaster management unit at Ministry of Health.
2. Assess the knowledge skills on disaster preparedness of the district staff.
3. Refresher training for district staff if indicated by the assessment.
4. Complete training of district staff not already trained.
5. Strengthen district coordinating units if indicated by the assessment.
7. Strengthen surveillance system.
8. Evaluate the programme properly & regularly.
**Thailand**

<table>
<thead>
<tr>
<th>No</th>
<th>Evidence</th>
<th>Measure</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 1  | Awareness and understanding on Climate change and Health is quite low   | Capacity building and raising awareness at all levels.                                                                                  | Seminar for health practitioners/policy makers  
**Objectives:** to increase understanding of climate change and health, to develop policies/programmes on public health, and to make recommendations for action to other sectors to include concern about health impacts in their policy or programme.  
Develop training module on climate change and health for public health practitioners. |
|    | - Lack of policy support                                                 |                                                                                                                                          | Non-health sectors  
Informal meeting to provide information on health effects related to climate change.  
National conference on health and climate change (next year).                             |
|    |                                                                           |                                                                                                                                          | Community /general population  
Collaborate with public relations department and journalists to develop key messages and deliver messages to both the general population and specific groups (vulnerable group).  
Develop a communication plan on health related to climate change.  
Training or provide information to village health volunteers (VHV) to be key persons for delivering information on climate change, health impact and adaptation measures to communities. |
<table>
<thead>
<tr>
<th>No</th>
<th>Evidence</th>
<th>Measure</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 2  | Lack of evidence on health and climate change | Research and Development  
- To develop evidence base for policy makers  
- To promote awareness of health risk from climate change | Develop a research plan on health and climate change in Thailand by assessing existing knowledge, knowledge need and knowledge gaps in country—(engaging researchers from academic sector and other sectors).  
Develop health vulnerability and adaptation assessment at national level (qualitative and quantitative assessment: WHO Guideline).  
Develop risk mapping for risk areas (health vulnerability map) – GIS. |
| 3  | Strengthening health system | | Develop a mechanism on health and climate change – national committee on health and climate change (Chaired by Permanent Secretary of MOPH).  
Mapping public health units that are at a high risk from sea level rise or flood, and then develop a preparedness plan. |
| 4  | Best practice in mitigation supported in health sectors in Thailand, but need to upscale to other sectors. | Mitigation | Upscale Green and Clean hospital concept to health sector, communities, schools and private sector. |
### Timor-Leste

<table>
<thead>
<tr>
<th>Proposed Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. National awareness raising workshop on Climate Change and Health.</td>
</tr>
<tr>
<td>2. Continuing the schools’ initiative on climate change and health adaptation.</td>
</tr>
<tr>
<td>3. Coordination with Department of Meteorology and Disaster Operation Centre.</td>
</tr>
<tr>
<td>4. Training on vulnerability and adaptation assessment.</td>
</tr>
<tr>
<td>5. Revise existing document (IEC materials, strategy for EH).</td>
</tr>
<tr>
<td>7. Strengthening health information system &amp; department of epidemiology.</td>
</tr>
</tbody>
</table>
Annex 2

Country action plans – WPR Member countries

**Cambodia**

<table>
<thead>
<tr>
<th>Strategy 1: to increase resilience capacity of the population in combating vector-borne and waterborne diseases arising from climate change.</th>
<th>Development and update of technical guidelines for diagnosis, detection, control, prevention and treatment of vector-borne and waterborne diseases, injuries and other food poisoning illness arising from climate change.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up-scaling communicable disease control across the country, including conducting surveillance and research on malaria and dengue fever in the context of climate change.</td>
<td>Development and implementation of dengue control programme in provinces with high climate change risk.</td>
</tr>
<tr>
<td>Up-scaling malaria control programme to contain artemisin resistance in Plasmodium falciparum parasites and moving toward malaria pre-elimination status in Cambodia.</td>
<td>Up-scaling of national programme on acute respiratory infection, diarrhoeal disease and cholera in disaster-prone-areas, including conducting surveillance and research on waterborne and foodborne diseases associated with climate change variables.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strategy 2: to reduce impacts of extreme weather and disasters through better emergency preparedness plans and response.</th>
<th>Development and implementation of data collection system on health outcomes arising from natural disasters and other man-made disasters, taking into consideration gender impacts, in synergy or collaboration with the Cambodia Red Cross, NCDM, MOWRAM and other relevant agencies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting up and strengthening emergency preparedness and responsive network and plans, including food safety response, at all levels.</td>
<td></td>
</tr>
</tbody>
</table>
| Strategy 3: to build knowledge of the population and health personnel to cope with climate change impacts | Updating health database with inclusion of climate change variables and associated diseases for assessment of climate change impacts, response planning, and monitoring and evaluation.  
Organizing training on health impact/vulnerability assessment, modeling of climate variability and health impacts, surveillance and research based on training need assessment in collaboration with CCCD of the MOE, WHO and relevant health institutes such as Pasteur.  
Promoting public education and awareness campaigns with a focus on women through different means on health impacts of climate change, disease control, prevention, treatment, epidemic preparedness, and sanitation and hygiene etc.  
Capacity development for mainstreaming climate change in annual operation plans of Special Operating Agencies (SOA) as part of the Service Delivery Grant (Pool Funding Modality).  
Develop curriculum for TOT on climate change and public health.  
Training of trainers on climate change and public health.  
Training health professionals on climate change and public health. |
**Lao PDR**

<table>
<thead>
<tr>
<th>Priority area</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity building for central level and local level health sector on CCH</td>
<td>Training on health risks from climate change&lt;br&gt;Advocacy to increase levels of understanding on hygiene and health particularly during times of flood and drought&lt;br&gt;Capacity building for emergency response team (health sector)</td>
</tr>
<tr>
<td>Advocacy and awareness</td>
<td>Awareness on the impact of climate change on health for communities living in flood- and drought-prone areas in the prevention of disease outbreaks&lt;br&gt;Conduct public campaigns on diseases prevention in natural hazard prone areas</td>
</tr>
<tr>
<td>Vulnerability and adaptation assessment</td>
<td>Collecting data on vulnerable groups and adaptation&lt;br&gt;Prepare technical guidelines for climate change adaptation in the health sector</td>
</tr>
<tr>
<td>Integrated disease surveillance</td>
<td>Set up public health networks for surveillance of epidemic diseases from central to local level</td>
</tr>
</tbody>
</table>

**Philippines**

**Goal** - Protect the health of Filipinos from the effects of climate change

**Objectives**

- to have better health outcomes from more responsive health systems, in consideration of climate change impacts on health (service delivery)
- institute (public) health adaptation mechanisms towards climate change (governance)
- establish more equitable (focused on poor and marginalized) healthcare financing (financing)
- strengthen health regulatory mechanism to link CC and human health initiatives (regulation)
- Integrated CC and health systems development
- Partnership building
- Adaptation: identification/improvement of health technologies
A. Policy, plan and partnership

| Develop appropriate implementing instruments for local adaptation of the national climate change and health response initiatives |
| Coordinate with DOH-Health Emergency Management Service in developing standards and regulations on the preparedness and response to health emergencies |
| Develop mechanisms to generate resources, optimize their allocation and guarantee equitable distribution; encourage investment for the development of CCAH technologies |
| Continue networking and partnership building and undertake collaborative efforts for advocating and implementing CCAH |

B. Service provision, capacity and infrastructure enhancement

| Conduct capability building for local health partners on health vulnerability and capacity assessment |
| Coordinate with concerned DOH offices on facility enhancement e.g. upgrading of hospitals and other health facilities to make them CC-proof, in adherence with infrastructural and service standards |

C. Health promotion, research, surveillance and monitoring

| Develop communication interventions to influence societal and community actions towards CCAH |
| Conduct studies for evidence-based decision making with emphasis on establishing links connecting CC and adverse health |
| Generate reliable, relevant, up-to-date information in response to negative health effects of CC; develop surveillance system for CC-sensitive diseases |
| Document events and progress in implementation, lessons learned and sharing of good practices |

D. Strengthening organizational structure for CC at different levels of governance

| Advocate to all DOH health programmes (e.g. VBD, FWB) to adopt and mainstream CCAH in their respective projects and activities |
| Designate CC focal person in all health offices and facilities |
| Establish organizational structure with delineation of roles and responsibilities for coordination and collaboration among all health stakeholders for CCAH activities |
### Papua New Guinea

<table>
<thead>
<tr>
<th>Priority area</th>
<th>Strategy</th>
<th>Activity</th>
</tr>
</thead>
</table>
| Improve and strengthen partnership between relevant stakeholders | Advocacy and consultation with relevant stakeholders | Conduct stakeholder meetings, identify relevant issues facing health sector  
Establish understanding and dialogue for information dissemination/sharing |
| Improve capacity of health sector to better manage CC&H | Improve management of EH data                 | Establish a computer data base system for EH branch                                                                                      |
| Improve human resource capacity within health sector | Improve staff capacity to enhance competency and to achieve better work outcomes | Conduct x 4 regional training for EHOs on CC&H                                                                                           |

### Samoa

<table>
<thead>
<tr>
<th>Activities</th>
<th>Output Indicator</th>
<th>Outcome Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key strategic area 1 – health governance, policy and management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revise the TOR for Communicable Diseases Control Committee (CDCC) to reflect climate change and health (facilitate implementation and advise NHEDMC)</td>
<td>TOR developed and revised, consulted and approved by the DGoH</td>
<td>The CASH implementation is more coordinated and articulated</td>
</tr>
</tbody>
</table>
| Establish Climate Change and Health Coordination Unit under an appropriate division and led by the Principal Climate Change and Health Officer  
The Unit coordinates & monitors the implementation of the CASH | Climate Change and Health Unit established | Multisectoral collaboration strengthened  
Climate Change and Health Programmes are more coordinated and harmonized |
<table>
<thead>
<tr>
<th>Activities</th>
<th>Output Indicator</th>
<th>Outcome Indicator</th>
</tr>
</thead>
</table>
| To prepare proposals for funding climate change and health-related activities | Proposal to DG to include funding for climate change and health in the WHO Biennium Budget and also in local budget approved  
Proposals for funding submitted to development partners                  | Funding for climate change and health interventions secured under WHO biennium budget, MOH local budget at a minimal cost with one year given for the utilization of funds and DPs |
| Review the health legislations, policies and plans to assess gaps in terms of adaptation needs for climate change and health | Existing health legislation and policies assessed and reviewed to reflect and address:  
- greenhouse gas emissions  
- industrial developments  
- enforcement of health impact assessments (HIAs)  
National influenza and pandemic plan | Climate change and health issues are addressed and enforced through relevant health policies and legislation |
| Regular update of Health Sector Disaster Management and Response Plan to ensure climate health issues are reflected. Include regular drills and tests  
Regular updates of contacts and inform relevant partners | Health Sector Disaster Management and Response Plan updated regularly  
Each health sector organization Disaster and Management Plans (DMPs) revised and updated regularly  
Individual DMPs are aligned to the national DMPs | Improved preparedness and response for climate health impact |
| Coordinate the collation of all existing databases and information systems related to climate change and health for more coordinated interventions | The current GIS (that is with MOH) reviewed and strengthened to include mapping of climate change related diseases etc.  
Climate-health information system in place and shared with all partners | Evidence-based interventions and programmes |
### Activities

<table>
<thead>
<tr>
<th><strong>Activities</strong></th>
<th><strong>Output Indicator</strong></th>
<th><strong>Outcome Indicator</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Climate change and health information linked with E-health</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Key Strategic Area 2: Cross-sectoral collaboration and partnership

| **Facilitate within-sector and across-sector understanding of the impacts of climate change and health in order to prevent and manage climate change health disasters** | **Consultations with stakeholders and partners**                                    | **Improved understanding and increased emphasis on climate-health**                   |
|                                                                                                                         | **Climate-health issues included in agendas of annual health forums and bilateral summits** | **Climate-health issues are reflected in other relevant sector policies**           |
| **Strengthen the climate early warning system to be integrated with the health warning/information system**             | **MOH and service providers connected to Climate Early Warning System (CLEWS) using existing social networks: (twitter, facebook, emails, texting)** | **Early warning system improved and linkages between health and climate change-related organizations strengthened** |
|                                                                                                                         | **Climate health unit is established as the health sector outside linkage and focal point for early warnings and information dissemination** |                                                                                    |
|                                                                                                                         | **Climate Early Warning System information should be disseminated to other levels down from the CEO level** |                                                                                    |
|                                                                                                                         | **Health organizations to provide MNRE/MET with focal point names to receive information from CLEWS** |                                                                                    |
## Report of a bi-regional workshop

<table>
<thead>
<tr>
<th>Activities</th>
<th>Output Indicator</th>
<th>Outcome Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Strategic Area 3: Capacity Development</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide continuous training to strengthen understanding on GIS/GPS and its use</td>
<td>Training conducted for relevant staff both within sector and across sector</td>
<td>Improved utilization of GIS for mapping, tracking, monitoring and appropriate interventions</td>
</tr>
<tr>
<td></td>
<td>Specialized training on the uptake and translation of information into response (MET) conducted</td>
<td></td>
</tr>
<tr>
<td>Regular community capacity building on climate change and health issues</td>
<td>Community capacity building programmes conducted through existing capacity building mechanisms</td>
<td>Improved community participation and commitment to addressing climate-health issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved mitigation measures within the community</td>
</tr>
<tr>
<td>Conduct continuous refresher courses for health sector staff on climate health issues and CLEWS</td>
<td>Refresher courses opportunities for staff facilitated and implemented through (POLHN, MOH technical meetings, meteorology division)</td>
<td>Staff knowledge updated and performance improved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved ability of health sector to analyze climate health information and plan ahead for appropriate interventions</td>
</tr>
<tr>
<td>Training for staff on mental health management of post-traumatic disorders/stress</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Key Strategic Area 4: Vulnerability and Adaptation assessment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work in collaboration with other sectors in conducting vulnerability and capacity adaptation assessments on climate-health</td>
<td>Vulnerability and capacity adaptation assessments for the health sector and health system completed</td>
<td>Improved knowledge on climate-health vulnerability and adaptation measures strengthened</td>
</tr>
<tr>
<td></td>
<td>VCA assessments on health system response</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vulnerability assessment of the health system (HRH, HIS, medical products)</td>
<td></td>
</tr>
</tbody>
</table>
### Activities

<table>
<thead>
<tr>
<th>Activities</th>
<th>Output Indicator</th>
<th>Outcome Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilize assessment findings for advocacy at higher level and appropriate interventions / policy decision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-traumatic exposure and mental health response</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Key Strategic Area 5: Cross-sectoral prevention and risk management

<table>
<thead>
<tr>
<th>Collaborate with relevant organizations for the prevention and management of diseases of public health importance</th>
<th>Health education and promotion programmes strengthened</th>
<th>Public health response strengthened</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spraying, quarantine, water quality, sanitation, HCW, clinical response, vaccines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Procurement of PPEs for staff protection</td>
<td></td>
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<tr>
<td></td>
<td>Media &amp; communication</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Continuous sharing of information across sectors (e.g. zoonotic diseases etc)</th>
<th>Link with MAF and MET on animal &amp; human health issues</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>To carry out multi-media campaigns on adaptation measures for climate change on health</td>
<td>Public health bulletins</td>
<td></td>
</tr>
</tbody>
</table>
## Tuvalu

<table>
<thead>
<tr>
<th>Activities</th>
<th>Timeline</th>
<th>Responsible agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Training-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- health promotion department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- nutrition &amp; dietician department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- public health staff nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Stakeholders:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- meteorological department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- disaster coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- environment department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- finance department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- women’s department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- island leaders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Red Cross</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- public works utilities department</td>
<td></td>
<td></td>
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<tr>
<td>- fisheries department</td>
<td></td>
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<tr>
<td>- agriculture department</td>
<td></td>
<td></td>
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<tr>
<td>- media</td>
<td></td>
<td></td>
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<tr>
<td>- PACC project</td>
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<td></td>
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<tr>
<td>- NAPA project</td>
<td></td>
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<tr>
<td>- water &amp; sanitation project</td>
<td></td>
<td></td>
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<tr>
<td>- water sector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare proposals for funding climate change and health related activities.</td>
<td>2014 - 2015</td>
<td>MOH</td>
</tr>
<tr>
<td>Review the health legislation, policies and plans to assess gaps in terms of adaptation needs for climate change and health</td>
<td>By 2015</td>
<td>MOH and relevant partners</td>
</tr>
<tr>
<td>Draw a plan and implement the plan at all levels</td>
<td>2014</td>
<td>MOH</td>
</tr>
<tr>
<td>Activities</td>
<td>Timeline</td>
<td>Responsible agency</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
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<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Coordinate the collation of all existing databases and information systems related to climate change and health for more coordinated interventions</td>
<td>2015 By 2016</td>
<td>Health Sector, Disaster Coordinator, Environment Department, Water sector</td>
</tr>
<tr>
<td>Facilitate within-sector and across-sector understanding of the impacts of climate change and health in order to prevent and manage climate change health disasters</td>
<td>By 2015 Annually</td>
<td>MOH and all sector partners</td>
</tr>
<tr>
<td>Strengthen the climate early warning system to be integrated with the health warning/information system</td>
<td>By 2015</td>
<td>MOH and National Disaster Coordinator</td>
</tr>
<tr>
<td>Preparation plan for each MOH department;</td>
<td>2014 - 2015</td>
<td>MOH</td>
</tr>
<tr>
<td>• Environmental Health – vector control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Food safety</td>
<td></td>
<td></td>
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<tr>
<td>- Water quality monitoring</td>
<td></td>
<td></td>
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<tr>
<td>- Waste management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Sanitation</td>
<td></td>
<td></td>
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<tr>
<td>• Public health nurses</td>
<td></td>
<td></td>
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<tr>
<td>- Immunization</td>
<td></td>
<td></td>
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<tr>
<td>- Health care to babies</td>
<td></td>
<td></td>
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<tr>
<td>• Nutrition</td>
<td></td>
<td></td>
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<tr>
<td>- promote nutritional diet</td>
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</tbody>
</table>
### Viet Nam

Conduct a training workshop on climate change and health for members of CC&H–MOH
- Training material: WS Indonesia 1-2015
- Financial: Gov
- Organize: MOH & Ministry of National Resources and Environment
- Time: QII/2015

Develop IEC material, handbook on climate change and health and distribute to vulnerable areas:
- Leaflets
- Poster
- Handbook

Conduct research related to climate change and vector-borne and waterborne diseases:
- Dengue fever in the South (Pasteur Institute Ho-Chi-Minh-city)
- Diarrhoea
Annex 3

Agenda

(1) Opening session
(2) Session 1: Introduction to climate change, understanding the relationship between climate change and health
(3) Session 2: Options for responding to climate change, assessing how vulnerable health is to climate change.
(4) Session 3: Understanding the impacts of thermal extremes and extreme weather events, and managing disaster risk. Learning from good practices in the region.
(5) Session 4: Modelling disease and other health impacts under climate change, and understanding how disease can spread. Food and nutrition impacts. Learning from good practices in Indonesia.
(6) Session 5: Air quality. Communicating what we know about climate change and health
(7) Short country presentations on action plans
(8) Closing
### Annex 4

**List of participants**

<table>
<thead>
<tr>
<th>Country Participants</th>
<th>South-East Asia Region</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bangladesh</strong></td>
<td></td>
</tr>
<tr>
<td>Mr Md. Enamul Hoque</td>
<td>Joint Secretary</td>
</tr>
<tr>
<td>Ministry of Health &amp; Family Welfare</td>
<td></td>
</tr>
<tr>
<td>Dhaka, Bangladesh</td>
<td></td>
</tr>
<tr>
<td><strong>Bhutan</strong></td>
<td></td>
</tr>
<tr>
<td>Ms Rada Dukpa</td>
<td>Assistant Programme Officer</td>
</tr>
<tr>
<td>Department of Public Health</td>
<td></td>
</tr>
<tr>
<td>Ministry of Health</td>
<td></td>
</tr>
<tr>
<td>Thimphu, Bhutan</td>
<td></td>
</tr>
<tr>
<td><strong>India</strong></td>
<td></td>
</tr>
<tr>
<td>Dr Inder Prakash</td>
<td>Deputy Director General (PH)</td>
</tr>
<tr>
<td>Directorate General of Health Services</td>
<td></td>
</tr>
<tr>
<td>Ministry of Health &amp; Family Welfare</td>
<td></td>
</tr>
<tr>
<td>New Delhi</td>
<td></td>
</tr>
<tr>
<td><strong>Indonesia</strong></td>
<td></td>
</tr>
<tr>
<td>Dr Kodrat Pramudho, SKM, M.Kes</td>
<td>Head of BBTKLPP (Regional Environmental Health Office) Jakarta</td>
</tr>
<tr>
<td>Jakarta</td>
<td></td>
</tr>
<tr>
<td>Dr Ann Natallia Umar</td>
<td>Head of Section Monitoring and Evaluation</td>
</tr>
<tr>
<td>Sub directorate Healthy Settlement and Public Places</td>
<td></td>
</tr>
<tr>
<td>Directorate of Environmental Health</td>
<td></td>
</tr>
<tr>
<td>Jakarta</td>
<td></td>
</tr>
</tbody>
</table>

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Report of a bi-regional workshop

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WHO-SEARO
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Water, sanitation and health

WHO-WPRO
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Health and the Environment
Division of NCDs and Health through the Life-Course
Mr Jung Sub Yeom
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Division of NCDs and Health through the Life-Course

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Capacity-building of national level staff is very important for implementation of health adaptation plans in Member States as well as sustaining them in the long term. While advocacy and awareness on the health impacts of climate change have been created in the last several years, there is a huge need for capacity development of public health professionals to understand the linkages and streamline climate change in public health programmes, strengthening health systems, addressing health issues in the policies and programmes of other sectors and raising health concerns in international climate change negotiations.

WHO-SEARO and WPRO jointly revised and updated a training package on climate change and health. To roll out the training package, the two offices jointly organized a Bi-Regional workshop on Climate Change and Health, Gadjah Mada University, Yogyakarta, Indonesia, 26–30 January 2015.

This report features the proceedings of the workshop that resulted in a clear understanding by all participating countries and Regional Offices of the basic concepts and latest evidence in climate change science and health impact, best practices on adaptation and mitigation measures to reduce climate change, and methods of institutionalizing capacity building programmes at the national level.

"WHO greatly appreciates and thanks GIZ for their contribution in making this Bi-Regional workshop a success. Without GIZ support, the development of the training package and the workshop would not be possible"