Building health systems resilience to climate change

Health is sensitive to climate change. The risks to health from climate change include mortality and morbidity due to extreme heat, injuries and mortality due to extreme weather events, vector- and waterborne diseases due to changes in the ecosystem, respiratory diseases due to increased emissions, and mental health and nutritional issues. Health-care facilities are also vulnerable to climate change and extreme weather events.

A well-prepared and responsive health system is crucial for preventing and minimizing the health risks posed by climate change. Member States have recognized these risks and have initiated advocacy and capacity-building efforts, developed health national adaptation plans and conducted a few research studies. The level of response varies in countries based on the availability of funds. Much remains to be done to ensure that climate change is mainstreamed in overall health policy, planning and programming.

An informal consultation to prepare for the Ministerial Roundtable on building health systems’ resilience to climate change was held in Male’, Maldives on 14–15 May 2017. All Member States of the WHO South-East Asia Region participated in the consultation. The consultation proposed for a draft Ministerial Declaration and a Framework for Action on Building Health Systems Resilience to Climate Change. The Minister of Health, Maldives circulated the drafts to the other Health Ministers of Health of SEAR for their review and feedback on 20 June 2017.

The drafts were presented to the High-Level Preparatory (HLP) for review and recommendations. The recommendations made by the HLP to finalise the Declaration and Framework for Action were:

**Actions by Member States**


3) Prepare talking points for health ministers for the Ministerial Roundtable at the Seventieth Session of the Regional Committee, taking into account the meeting format and issues to be addressed by the honourable ministers.

**Actions by WHO**

1) Support the Ministry of Health of Maldives in collating feedback and finalizing the Declaration and Framework for Action.

2) Coordinate and communicate with Member States on the final preparations for the Ministerial Roundtable.

The Male’ Declaration and Framework for Action for building health systems resilience to climate change are submitted to the Seventieth Regional Committee for its consideration and endorsement.
Introduction

1. There is growing body of evidence demonstrating that climate change has affected some aspects of human health. This is the result of increased atmospheric concentrations of greenhouse gases generated by human activity. More effects are likely to occur in the future, especially in developing countries. The Fifth Assessment Report of the Inter-Governmental Panel on Climate Change (IPCC AR5) suggests that climate change can affect health in three ways:

   - directly through changes in the frequency of extreme weather events such as intense heat waves, floods, sea-level rise and storms. The health risks include heat-related illnesses and deaths, and injuries and death from extreme weather events;
   - indirect impacts of climate change on health, mediated through changes in ecosystems. Of greatest concern are the increased risks of waterborne diseases, vector-borne diseases, and cardiovascular and respiratory diseases (due to air pollution);
   - indirect impacts mediated by human systems, mainly through increased risk of undernutrition from diminished food production in poor regions, occupation health issues and mental stress.

2. In addition to the impacts on the health of people, climate change and extreme weather events can also cause damage to health facilities. This has the potential to disrupt health services, as road blocks may limit the accessibility of supplies; essential services needed for running health facilities, such as energy and water supply, may be interrupted, and patients’ accessibility to health facilities may be obstructed.

3. The rural poor, urban slum dwellers, populations of small islands, mountain people and those living in coastal areas will be the most affected. The effects of climate change will be felt mostly in countries where health systems are weak, and the capacity to adapt and respond to climate change are low.

4. Recognizing the impact of climate change on health, Member States of WHO adopted a World Health Assembly resolution WHA61.19 on climate change and health in 2008. Subsequently, Health Ministers of the WHO South-East Region passed a resolution (SEA/RC62/R2) during the Sixty-second Regional Committee Meeting in 2009. Article 1 of the 1992 United Nations Framework Convention on Climate Change (UNFCCC) refers to health being one of the sectors that will be adversely affected by climate change, and Article 4 refers to the commitments of countries to assess the health implications of adaptation and mitigation policies. The landmark Paris Agreement on climate change mentions the right to health in the Preamble and the Agreement explicitly recognizes the health impacts of climate change.

5. The 2030 Sustainable Development Goals (SDGs) have a dedicated SDG goal (SDG 13) on climate change – “Take urgent action to combat climate change and its impacts” and three of the SDG13 targets are applicable to the health sector.
Current situation

6. In the South-East Asia Region, Member States are experiencing an increased frequency and intensity of cyclones, floods, landslides, heat waves, droughts and sea-level rise. Floods in Myanmar in 2015, and in the Democratic People’s Republic of Korea and Sri Lanka in 2016 have taken many lives, injured many and displaced thousands of people. A study in India showed an increase in heat waves. In 2015, over 2500 people died due to a heat wave in south India. Droughts have affected parts of India and Sri Lanka in recent years; this impacts on crop production, increasing the risk for undernutrition as well as water- and foodborne diseases.

7. Contamination of drinking water by salt water intrusion due to sea-level rise is another issue faced by Bangladesh, parts of India, and Myanmar, Maldives, Sri Lanka and Thailand, while countries such as Bhutan and Nepal have reported drying up of water sources.

8. The Democratic People’s Republic of Korea has reported problems such as bronchial asthma and silicosis due to the “sandy dust” phenomenon, which is triggered by dry weather and drought conditions.

9. All Member States are endemic to many climate-sensitive vector-borne diseases such as dengue, malaria, chikungunya and Japanese encephalitis (JE). A study from Nepal showed that a 1°C increase in mean temperature increased the incidence of malaria by 25%. A study from Bangladesh showed the disproportionate health risks from climate changes of vulnerable population groups, which manifest as malaria, dengue, childhood diarrhoea and pneumonia. A sentinel surveillance conducted as part of a pilot project on health adaptation in Bhutan found the Culex and Anopheles vectors at very high altitudes (>2100 m).

10. Health-care facilities and health services in all Member States are vulnerable to climate change and extreme weather events. These exert effects in several ways, such as damage to the health infrastructure, blocked access to facilities and disrupted energy, water and other services, which are essential for running health-care facilities.

Current responses and challenges

11. WHO has been supporting Member States in creating awareness on the impacts of climate change on health, building their capacity for developing health adaptation plans, water safety plans, quality surveillance and monitoring, and health-care waste management.

12. Ministries of health in all Member States have appointed climate change and health focal points, but most units are not funded. Health adaptation measures have been piloted or implemented in a few countries that received funds from external donors (Bangladesh, Bhutan,

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Nepal and Maldives). Other countries that have initiated action, however, were challenged by a lack of funds.

13. While the effects of climate change on health have gained attention in general, there is still room for raising awareness and understanding of these in the public policy process, particularly in the formulation and revision of public health policies. Sectors responsible for climate-sensitive diseases/programmes and environmental determinants of health should also be made aware of these and build in risk mitigation measures.

14. Health national adaptation plans (HNAPs) are necessary for addressing the medium- and long-term impacts of climate change. Nepal’s HNAP was approved by the government. Bhutan, India, Indonesia, Sri Lanka and Thailand have drafted HNAPs and the remaining Member States have plans to develop HNAPs.

15. Sri Lanka and Thailand have introduced the green hospital concept to reduce greenhouse gas emissions, which contributes to mitigating the effects of climate change. Bhutan has piloted an integrated climate and health disease surveillance system in five districts. India is reviewing its disease surveillance system to improve timely reporting of and response to climate-sensitive diseases. India, Sri Lanka and Thailand have developed heat health action plans for responding to heat waves.

16. Although some small studies have been carried out in this area in the Region, these are not adequate for evidence-based policy-making. There is thus a need to partner with universities and research institutes to carry out national and multicountry research, both to understand the impact of climate change and the effectiveness of adaptation measures.

**Suggested directions and way forward**

17. Climate change is a cross-cutting issue. There is a need to mainstream it in overall health planning and programming. This can be achieved by progressively building the climate resilience of the six building blocks of the health systems. The current climate change and health units need to be strengthened. These units can then further coordinate with climate-sensitive disease programmes in ministries of health to ensure that measures to combat the risks of climate change are embedded in these programmes. These units also need to work with health-determining sectors such as water, environment, energy, meteorology, emergencies, agriculture and transport. Working with health programmes and other sectors is crucial for addressing the impacts of climate change on health and ensuring the sustainability of measures in the long run.

18. Continuous advocacy and capacity development on the subject is important for further intensifying climate and health work. Human, technical and financial resources are of paramount importance.

19. The World Health Organization’s Regional Office for South-East Asia organized an informal consultation to prepare for the Ministerial Roundtable on “Building health systems resilience to climate change” in Male’, Maldives on 14–15 May 2017. The consultation took stock of the
current health response to climate change and identified priority actions for strengthening health systems’ capacity to respond to climate change. The outcomes of the informal consultation are a proposed draft Ministerial Declaration on Building Health Systems Resilience to Climate Change and a Framework for Action (Annexures 1 and 2).

20. The Draft Ministerial Declaration and the Framework for Action are being proposed to the South-East Asia (SEA) Seventieth Session of the Regional Committee through the High-Level Preparatory Meeting. These are to be considered as part of the agenda for the Ministerial Roundtable at the Seventieth Session of the WHO Regional Committee for South-East Asia in September 2017.

Conclusion

21. Addressing climate change requires a health system-wide approach so that eventually the measures to combat climate risks are embedded in health programmes. Hence, Member States have agreed to work on the six building blocks of the health system using the WHO Operational framework for building climate-resilient health systems to prepare health systems to adapt and respond to climate change in a systematic manner. Member States have identified key priority actions to be taken in the next five years based on need. These actions are in line with the various international conventions and agreements on climate change and the environment, and the SDGs.
Male‘ Declaration

Building Health Systems Resilience to Climate Change

We, the Health Ministers of Member States of the WHO South-East Asia Region, participating in the Seventieth session of the WHO Regional Committee for South-East Asia in Male’, Maldives,

Recognizing the increasing body of evidence on the direct and indirect impacts of climate change on human health and health systems, which pose a serious burden to sustainable socioeconomic development;

Concerned that extreme weather events, which are increasing in frequency and intensity in the Region, can overwhelm the already overstretched health sector’s capacity to respond and pose health threats to the most vulnerable populations in the Region, especially children, the poor, elderly and immunocompromised;

Reaffirming the commitment made to resolution WHA 61.19 of the World Health Assembly, and resolution SEA/RC62/R2 of the WHO Regional Committee for South-East Asia on climate change and health; the Parliamentarians’ call for action on protecting human health from climate change in the South-East Asia Region, and the Dhaka Declaration on South-East Asia regional health concerns for climate change negotiations;

Recalling the reference to the right to health in the 2015 Paris Agreement on Climate Change, Sustainable Development Goal 13 to take urgent action to combat climate change and its impacts, and the Sendai Framework for Disaster Risk Reduction 2015–2030;

Acknowledging the efforts being made by countries and development partners in the South-East Asia Region to address the challenges posed by climate variability and climate change;

Recognizing the opportunities presented by climate change to strengthen the capacity and efficiency of health systems to be responsive, reduce vulnerabilities and increase resilience to climate and extreme weather events;

Note and welcome the WHO Operational Framework on building health systems resilience to climate change.

We, therefore:
1. Endorse the South-East Asia Regional Framework for Action on Building Health Systems Resilience to Climate Change 2017–2022, as annexed to this Declaration, as the operational reference in implementing this Male’ Declaration;

2. Call upon UN agencies and other international organizations, development partners, philanthropic agencies, academic and civil society organizations to support the implementation of this Declaration, including in SEA Member States, to mobilize financial, human and technical resources;

3. Confirm our commitments at national level:
   3.1 to continue to raise public and policy awareness on the health impacts of climate change across the entire society, and ensure the leading role of the health sector in addressing the impacts of climate change, including as role models for greening initiatives;
   3.2 to advocate and work with health-determining sectors to ensure that climate-sensitive health concerns are well taken into account and integrated in their policies and programmes;
   3.3 to develop and/or strengthen health national adaptation plans (HNAPs), and ensure that climate risks are integrated into health policy and across relevant health and climate-sensitive disease (CSD) programmes;
   3.4 to strengthen national capacity in building health systems resilience to climate change, including establishing and/or strengthening national institutions for conducting training for the current and future health workforce;
   3.5 to enhance health sector preparedness to climate change, particularly in promoting climate-resilient health-care facilities to ensure that these are able to withstand any climatic event, and that services such as water, sanitation, waste management and electricity are functional during such events;
   3.6 to initiate greening of the health sector by adopting environment-friendly technologies, and using energy-efficient services;
   3.7 to establish and strengthen climate change and health information systems and research, and promote the dissemination of evidence, including in the operational areas of health vulnerability assessment to climate change, health risk mapping, and CSD surveillance systems, in alignment with capacity development for implementing the International Health Regulations (IHR);
   3.8 to intensify the engagement and proactive role of the health sector in comprehensive collective efforts to address the impact of climate change, including the three basic pillars of life – water, air and food;
   3.9 to ensure that climate risks are integrated in natural disaster risk management, including emergency risk reduction and response;
3.10 to mobilize domestic and external financial resources, including through advocacy for a better share of current climate change funding mechanisms, allocated to the health sector;

4. **Request** the SEA Regional Director:
   4.1 to raise awareness and advocate for international attention to, and support SEA Member States in mobilizing resources to address, the health impacts of climate change;
   4.2 to promote knowledge- and experience-sharing mechanisms, including through establishing research networks and centres of excellence in climate change and health;
   4.3 to provide technical support to, and strengthen the technical capacity of, Member States, including in monitoring and tracking progress in addressing climate change and health, and relevant SDG monitoring;
   4.4 to report on the progress of implementing this Male’ Declaration at the Seventy-fifth session of the WHO SEA Regional Committee, 2022.

Male’, Maldives

7 September 2017
Framework for Action in Building Health Systems Resilience to Climate Change in South-East Asia Region 2017-2022
CONTENTS

Note ................................................................................................................................................... 3
Abbreviations ..................................................................................................................................... 4
1. Background ..................................................................................................................................... 5
   1.1 Public health and climate change ................................................................................................. 5
   1.2 Response to climate change ........................................................................................................ 7
   1.3 Climate change in the SDGs ......................................................................................................... 7
   1.4 Potential roles of the health sector in CC&H ............................................................................... 8
   1.5 Challenges in promoting health system resilience to climate change ......................................... 9
2. WHO operational framework on building climate-resilient health systems .............................. 10
3. Experience in implementing the WHO Operational Framework in the South-East Asia Region ................................................................................................................................. 11
   Component 1 – Leadership and governance .................................................................................... 11
   Component 2 – Health workforce .................................................................................................... 13
   Component 3 – Vulnerability, capacity and adaptation assessment .................................................. 14
   Component 4 – Integrated risk monitoring and early warning ......................................................... 14
   Component 5 – Health and climate research ................................................................................... 15
   Component 6 – Climate-resilient and sustainable technologies and infrastructure .................... 17
   Component 7 – Managing the environmental determinants of health .......................................... 18
   Component 8 – Climate-informed health programmes .................................................................. 19
   Component 9 – Emergency preparedness and management ......................................................... 19
   Component 10 – Climate and health financing .............................................................................. 20
4. Action framework in building health systems resilience to climate change ................................. 22
   General objective ............................................................................................................................. 22
   Specific objectives ............................................................................................................................ 22
   Concept ........................................................................................................................................... 22
   Regional indicators .......................................................................................................................... 22
References .......................................................................................................................................... 28
NOTE

This Framework was developed in consultation with Member States of the South-East Asia Region, mainly through the Informal Consultation to prepare for the Ministerial Roundtable on Building Health Systems Resilience to Climate Change, which will be organized as part of the Seventieth session of the WHO South-East Asia Regional Committee. Held on 14–15 May 2017 in Male’, Maldives, the Consultation was attended by programme managers of climate and health from all 11 Member States of the Region. The meeting was opened by the Minister of Health and attended by the WHO Representative to Maldives, the State Minister of Health, Maldives and senior Ministry of Health (MoH) officials. At this Consultation, Member State representatives presented their work on climate change and health focusing mainly on the areas of health risks faced by each country, existing governance and institutional set-up, health adaptation measures and mitigation actions. The Consultation discussed the way forward, and identified key points to be included in the draft Male’ Declaration and Framework for Action. The Framework for Action was drafted with inputs from all Member States as a list of prioritized actions, based on the needs of countries. The development of this Framework has taken considerable account of the following: the Sustainable Development Goals (SDGs), the Global Agreement on Climate Change, the intended nationally determined contributions (INDCs) of Member States submitted to the United Nations Framework Convention on Climate Change (UNFCCC), the World Health Assembly and South-East Asia Regional Committee resolutions on related areas. Lastly, it was prepared based on the WHO Operational Framework on Building Climate-Resilient Health Systems.
## Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CC&amp;H</td>
<td>climate change and health</td>
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<tr>
<td>CSD</td>
<td>climate-sensitive disease</td>
</tr>
<tr>
<td>GHG</td>
<td>greenhouse gas(es)</td>
</tr>
<tr>
<td>HNAP</td>
<td>health national adaptation plan for climate change</td>
</tr>
<tr>
<td>IEC</td>
<td>information, education and communication</td>
</tr>
<tr>
<td>INDC</td>
<td>intended nationally determined contribution</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<tr>
<td>MoH</td>
<td>Ministry of Health</td>
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<tr>
<td>NAP</td>
<td>national adaptation plan for climate change</td>
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<tr>
<td>NGO</td>
<td>nongovernmental organization</td>
</tr>
<tr>
<td>NDPCC</td>
<td>National Disaster Preparedness Central Committee</td>
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<tr>
<td>SDG</td>
<td>Sustainable Development Goal</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>V&amp;A</td>
<td>vulnerability and adaptation assessment</td>
</tr>
<tr>
<td>WASH</td>
<td>water, sanitation and health</td>
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<td>WHO</td>
<td>World Health Organization</td>
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</table>
1. **BACKGROUND**

1.1 Public health and climate change

There is a growing body of evidence demonstrating that climate change resulting from increased atmospheric concentrations of greenhouse gases (GHG) generated by human activity has already affected some aspects of human health, and will increase in future, especially in low- and middle-income countries and populations. Climate change will disproportionately affect vulnerable groups in each country, including children, the poor, elderly, agriculture workers and those with pre-existing medical conditions. Moreover, other environmental challenges such as increasing urbanization, the danger posed by hazardous waste and chemicals, water pollution and air pollution, would pose higher risks to public health.

The Intergovernmental Panel on Climate Change (IPCC) in its latest assessment report (AR5, 2014) suggests that climate change can affect health through three mechanisms:

1. **direct effects** through exposure to weather events, such as heat waves, floods and storms (exacerbated by sea level rise);
2. **indirect effects** mediated through environmental systems, such as changing patterns of vector-borne, foodborne and waterborne diseases, and rising air pollution; and
3. **indirect effects** mediated through social and human systems, such as undernutrition, occupational heat stress, mental illness, potential increase in population displacement, slowing of economic growth and poverty exacerbation.

The latest WHO estimate reports that globally, 250 000 additional deaths per year would be attributable to climate change between 2030 and 2050. This is a conservative estimate that considers only a subset of health impacts from climate change (heat-related mortality, coastal flood mortality, diarrhoea, malaria, dengue and undernutrition). Studies carried out in the WHO South-East Asia Region also raise the same concerns on increasing health vulnerability from climate change. Recent studies from this Region provide some evidence of the impacts of climate change on health at the local level. A study from India found that heat waves had increased in frequency, as had their average and maximum duration all over India. The heat wave in 2015 alone claimed more than 2500 lives in south India. A study from Nepal showed that a 1°C increase in mean temperature increased the incidence of malaria by 25%. A study from Bangladesh revealed the disproportionate health risks of vulnerable population groups from climate change, mainly malaria, dengue, childhood diarrhoea and pneumonia. A sentinel surveillance conducted as part of a pilot project on health adaptation in Bhutan found the presence of *Culex* and *Anopheles* vectors at very high altitudes (>2100 m) for the first time.

In addition to the impacts of climate change on health, climate change and extreme weather events also impact on health facilities themselves in a number of ways: by disruption of supplies due to blocked roads, damage to essential services such as energy and water supply and obstructing patients’ access.

A summary of health risks posed by climate change as reported by Member States of the South-East Asia Region is presented in Table 1.
### Table 1. Major health risks from climate change in the South-East Asia Region by country (source: country presentations made on 14 May 2017)

<table>
<thead>
<tr>
<th>Country</th>
<th>Health risks from climate change</th>
</tr>
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<tbody>
<tr>
<td>Bangladesh</td>
<td>• Diarrhoeal diseases from temperature change and disasters, malaria, dengue, kala-azar, mortality from excess floods, cyclones, storm surges, droughts and heat waves, injuries, psychosocial stress and respiratory diseases</td>
</tr>
<tr>
<td>Bhutan</td>
<td>• Death and injuries due to glacial lake outburst floods, landslides and flash floods, malaria, dengue and Japanese encephalitis (sporadic cases have been reported), chikungunya (first documented in 2012 in southern Bhutan (Samtse and Chukha)), waterborne diseases and respiratory infections</td>
</tr>
</tbody>
</table>
| Democratic People’s Republic of Korea        | • Injury, drowning and deaths due to typhoons and storms, leptospirosis, acute gastrointestinal infections, mental health disorders caused by climate extremes, nutritional deficiencies due to food insecurity resulting from flooding and drought  
• Bronchial asthma and silicosis due to sandy storm phenomena  
• Waterborne diseases due to drying of water sources and scarcity of water  
• Damages to health facilities and equipment; disruption of power and water supply, which are essential for running health facilities |
| India                                        | • Mortality and morbidity related to heat stress, malaria, dengue, Japanese encephalitis (JE), kala-azar, waterborne diseases due to flooding, respiratory diseases due to poor air quality, injuries and deaths due to extreme weather events, undernutrition due to food insecurity caused by droughts and mental health |
| Indonesia                                    | • Malaria, dengue and leptospirosis, diarrhoea due to flooding, respiratory infections due to air pollution caused by forest fires, malnutrition due to failed harvest caused by drought or flooding  
• Damages to health-care facilities and services |
| Maldives                                     | • Dengue, chikungunya, scrub typhus, risk of newly emerging diseases such as Zika virus infection, increased risk of waterborne diseases such as diarrhoea, typhoid due to unsafe water and poor sanitation, mental health issues, injuries due to extreme weather events and undernutrition due to the effect of flooding or drought to agriculture  
• Increased risk to health-care facilities located in coastal areas |
| Myanmar                                      | • An increase in heat-stress, heat exhaustion and dehydration due to an increase in temperatures and extreme temperature events  
• Longer season and distribution of vector-borne diseases such as malaria, an increase in social and mental stress due to disasters and displacement, increase in food insecurity leading to malnutrition and hunger, particularly among children  
• Health risks due to salinity in the groundwater due to rise in sea levels in coastal areas |
<table>
<thead>
<tr>
<th>Country</th>
<th>Health risks from climate change</th>
</tr>
</thead>
</table>
| Nepal     | • Disruption of health services and damage to health-care facilities.  

  • Vector-borne diseases (malaria, dengue, lymphatic filariasis, kala-azar, JE, chikungunya), waterborne and foodborne diseases, cardiorespiratory diseases, malnutrition, injuries and mental illness |
| Sri Lanka | • Almost all districts are vulnerable to dengue, death and disability due to landslides and floods, diseases due to air pollution, heat-related morbidity and mortality, especially among informal sector workers (farmers and construction workers), and children and the elderly |
| Thailand  | • Dengue, respiratory diseases, heat-related illnesses, drowning and injuries due to floods, and damage to health facilities due to floods and coastal erosion |
| Timor-Leste | • Vector-borne diseases such as malaria and dengue, heat-related mortality, undernutrition, diarrhoeal diseases and disruption to health-care services due to extreme weather events |

1.2 Response to climate change

The impacts of climate change will be mostly felt in countries where health systems are weak, and the capacity to adapt and respond to climate risks is low. Recognizing the impact of climate change on health, WHO Member States unanimously adopted World Health Assembly resolution WHA61.9 “Climate change and health” (CC&H) in 2008 and subsequently South-East Asia Regional Committee Resolution SEA/RC62/R2 “Climate change and human health”, which was passed during the Sixty-second Regional Committee in 2009. The resolutions were operationalized by including climate change activities in WHO country workplans and have been implemented progressively over the past nine years. Initially, the focus of climate and health responses in the Region was on creating awareness among all stakeholders, developing the capacity of public health professionals to understand the linkages, and streamline climate change into public health programmes – conducting research – and increasing the decision-making ability of policy-makers. More recently, however, increasing attention is being given to developing and implementing health national adaptation plans (HNAPs).

A recent evaluation of climate and health programmes in the South-East Asia Region\(^\text{11}\) shows that awareness of the health impacts of climate change is high among health and other relevant ministries. The evaluation, however, identified that only a small number of national public health policies currently include climate change as a key consideration. In order to effectively build health resilience to climate change, it is important to clearly articulate health risks arising from climate change, so that appropriate responses are developed, public health programmes include climate risks in their planning and policy, support from partner ministries (such as water, agriculture, energy, environment, etc.) is garnered for CC&H activities, and funding for building health systems’ resilience is accessed from both domestic and external resources.

1.3 Climate change in the SDGs

Major progress on CC&H at the international level in recent times include the Sustainable Development Agenda, the 2015 Paris Agreement on Climate Change –particularly the inclusion...

As an essential agenda for sustainable development, climate change has a dedicated SDG goal (SDG 13) to “Take urgent action to combat climate change and its impacts” and three targets, all relevant to the health sector (Table 2).

**Table 2. SDG 13 targets and indicators**

<table>
<thead>
<tr>
<th>Targets</th>
<th>Indicators</th>
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<tbody>
<tr>
<td>13.1 Strengthen resilience and adaptive capacity to climate-related</td>
<td>13.1.1 Number of countries with national and local disaster risk-reduction strategies</td>
</tr>
<tr>
<td>hazards and natural disasters in all countries</td>
<td>13.1.2 Number of deaths, missing persons and persons affected by disaster per 100,000 people</td>
</tr>
<tr>
<td>13.2 Integrate climate change measures into national policies,</td>
<td>13.2.1 Number of countries that have communicated the establishment or operationalization of an</td>
</tr>
<tr>
<td>strategies and planning</td>
<td>integrated policy/strategy/plan that increases their ability to adapt to the adverse impacts</td>
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<tr>
<td></td>
<td>of climate change, and foster climate resilience and low GHG emissions in a manner that does</td>
</tr>
<tr>
<td></td>
<td>not threaten food production</td>
</tr>
<tr>
<td>13.3 Improve education, awareness-raising, and human and institutional</td>
<td>13.3.1 Number of countries that have integrated mitigation, adaptation, impact reduction and</td>
</tr>
<tr>
<td>capacity on climate change mitigation, adaptation, impact reduction</td>
<td>early warning into primary, secondary and tertiary curricula</td>
</tr>
<tr>
<td>and early warning</td>
<td>13.3.2 Number of countries that have communicated the strengthening of institutional, systemic</td>
</tr>
<tr>
<td></td>
<td>and individual capacity-building to implement adaptation, mitigation and technology transfer,</td>
</tr>
<tr>
<td></td>
<td>and development actions</td>
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**1.4 Potential roles of the health sector in CC&H**

The health sector – on which climate change has a major impact, can play many proactive roles in addressing climate change at the national, regional and global levels, within and outside the health sector boundary. A few examples follow.

1. Raise awareness and advocate for a better policy response to climate change, using health information.
2. Strengthen health systems to prepare for and minimize the impacts that are posed by climate change and extreme weather events.
3. Collaborate with other health-determining authorities in sectors such as water, environment, agriculture, energy and disaster management to include health in their climate adaptation plans and responses. For example, mitigation measures could be taken in the transport sector by reducing emissions, which would also produce health co-benefits.
4. Lead and be a role model by reducing GHG emissions and by taking initiatives to reduce the carbon footprint.
1.5 Challenges in promoting health systems resilience to climate change

While CC&H has gained attention in general, there is still room to raise awareness and understanding of climate risks in the public policy process, particularly in the formulation and revision of public health policies, and inclusion of climate risks in sectors responsible for climate-sensitive diseases (CSDs)/programmes and environmental determinants of health. Health adaptation measures were mostly piloted or implemented in countries that received funds from external donors. In all Member States, climate change risks have not been mainstreamed in overall health planning and programmes. Hence it was felt necessary to strengthen climate and health units to further coordinate with CSD programmes and health-determining sectors such as water, environment, energy, agriculture and transport. Working with these sectors is crucial in addressing the climate impacts on health and ensuring CC&H programme sustainability in the long term. Member States of the South-East Asia Region are short on evidence, in particular from local research, to develop context-relevant policy. Continuous advocacy and capacity development on the subject was also identified as important for further intensifying climate and health work. Human, technical and financial resources are of paramount importance to address CC&H in the Region. Although countries have full responsibility to better address CC&H, international agencies and external development partners have the potential to facilitate preparedness and capacity.

The Health Ministerial Roundtable is being held at an opportune time to garner political commitment to and technical support for embedding climate change risks in health planning and programming. It is of strategic importance to identify a priority list of actions based on the needs of countries, and in line with the various international conventions and agreements on climate change and the environment and the SDGs.
2. WHO OPERATIONAL FRAMEWORK ON BUILDING CLIMATE-RESILIENT HEALTH SYSTEMS

WHO’s operational framework on building climate-resilient health systems was launched in 2015 to guide Member States, particularly the health sector, to systematically and effectively address the increasing challenges posed by climate variability and change.

Developing the resilience of health systems is a cumulative process that occurs over the short-, medium- and long term. It entails building capacity:

- to understand, monitor, anticipate, communicate and prepare for the changing climate-related health risks;
- to prevent, respond to, manage and cope with uncertainty, adversity and stress;
- to adapt operations and health functions to cope with changing risk conditions;
- to effectively recover from crises and setbacks with reduced reliance on outside support; and
- to learn from experience and improve system capacity for the future.

The six building blocks of the health system (leadership and governance, health workforce, health information system, essential medical products and technologies, service delivery, and financing) are important starting points for building overall resilience of the health system to climate change and strengthen existing health system capacities. Therefore, the operational framework covers all six building blocks through 10 components (shown in the outer ring of Fig. 1) with some blocks (service delivery and health information systems) covered by multiple components.

In the process of developing these 10 components of health system resilience, and to protect the health of the population, the health sector needs to collaborate with sectors that have a direct influence on health such as water, energy and agriculture. Last but not least, the health sector must engage communities if health systems are to protect health and facilitate community resilience.

Fig. 1. Ten components of building climate-resilient health systems and the main connections to the six building blocks of health systems
3. EXPERIENCE IN IMPLEMENTING THE WHO OPERATIONAL FRAMEWORK IN THE SOUTH-EAST ASIA REGION

Component 1 – Leadership and governance

The objectives of this component are (i) to have specific responsibility and accountability mechanisms on climate change and health established within the health ministry, (ii) to have climate variability and change considerations reflected in the main health policies and programmes and (iii) to strengthen cross-sectoral collaboration and maximize synergies to ensure that decisions taken in other sectors protect and promote health.

Ministries of Health of all 11 Member States have identified a focal point for climate change and health, but most units are not funded.

Nepal and Sri Lanka have an approved HNAP and now the MoH, Nepal is working with the Ministry of Environment to integrate the HNAP in the overall national adaptation plan (NAP) for climate change. HNAP of Sri Lanka has been incorporated into the National Adaptation Plan for Climate Change 2016 to 2024. Additionally the Ministry of Health in Sri Lanka has developed and submitted the Nationally Determined Contributions on adaptation for the health sector with the overall Nationally Determined Contributions for Sri Lanka as per the Paris agreement.

Bhutan, India, Indonesia and Thailand have drafted HNAPs and are now finalizing them. The remaining countries have plans to initiate HNAPs in 2017.

The Government of India has instituted a national Expert Group on Climate Change and Human Health with wide representation of experts from concerned ministries/departments, institutions and nongovernmental organizations (NGOs).

The National Disaster Preparedness Central Committee (NDPCC) in Myanmar is responsible for coordinating the nation’s disaster risk management. Health care is one of the 10 subcommittees under the NDPCC, and it is chaired by the Union Minister for Health and Sports.

Fig. 2. Health workers treating patients affected by extreme heat in Myanmar
Thailand’s climate change master plan includes public health as one of the core components – focusing on strengthening public health services and health surveillance, and prevention systems.
Component 2 – Health workforce

Objectives of this component are to ensure that (i) a sufficient number of health workers with the required technical capacity are available to deal with the health risks posed by climate variability and change, (ii) resources, information, knowledge and processes employed by health are used in an efficient and targeted manner in the face of additional risks and (iii) awareness is raised of the link between climate change and health outcomes among different target audiences (policy-makers, senior staff, media and communities).

A regional training package consisting of 16 stand-alone modules on climate change and health was launched in 2015. Regional training on climate and health was conducted for programme managers of 10 Member States. Climate change and health focal points were trained in developing HNAPs.

Regional high-level advocacy meetings on climate change and health have been held in 2007, 2010 and 2015. All Member States have organized national- and subnational-level training on climate and health.

Bhutan has incorporated an Environmental Health and Climate Change module in the curriculum of in-service health workers, and conducted awareness and training for health professionals, village health workers and communities. The country has also developed information, education and communication (IEC) materials on climate change and health.

Nepal is adapting the regional training modules into a national training package on climate and health. Sri Lanka has conducted training workshops on climate change and health for Public Health Staff working at grass root level and trained around 350 workers throughout the country from 2013 to date.

Climate change and health has been included in school health programmes in Bangladesh and Timor-Leste. Sri Lanka has conducted training workshops on climate change and health for public health staff working at the grassroot level and trained around 350 workers at the district level throughout the country since 2013. Additionally, a training of trainer workshop was conducted at the national level in 2016 with support from WHO, wherein international and local experts participated as resource personnel. In addition, secondary school students in Sri Lanka are taught the subject of climate change. The country has incorporated climate change in Post Graduate Teaching for Medical doctors, MSc courses in Community Medicine and MPH in Public Health. Additionally IEC material on climate change have been developed by the Ministry of Health and distributed to reach communities throughout Sri Lanka.

Fig. 3. Students being taught about climate and health in Bangladesh
Component 3 – Vulnerability, capacity and adaptation assessment

The objectives of this component are (i) to develop a sound understanding of the main health risks posed by climate variability and change, and to identify the most vulnerable population groups in the country, (ii) to develop a baseline record on capacities and gaps within the health system in dealing with the challenges posed by climate change and (iii) to identify adaptation options, including their comparative advantages, potential costs and efficiency, to be made available for selection by health system decision-makers.

Bangladesh, Bhutan, India, Indonesia, Maldives, Nepal, Sri Lanka and Thailand have conducted vulnerability assessments for various CSDs and health conditions. Timor-Leste has conducted a vulnerability assessment of groundwater resources to climate change.

Table 3. Potential vulnerable populations to climate-sensitive diseases, Nepal

<table>
<thead>
<tr>
<th>Diseases</th>
<th>No. of districts</th>
<th>Potential risk population (%)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria</td>
<td>65</td>
<td>52.0 (recent)</td>
<td>All but mountain districts</td>
</tr>
<tr>
<td>Lymphatic filariasis</td>
<td>60</td>
<td>87.0</td>
<td></td>
</tr>
<tr>
<td>Japanese encephalitis</td>
<td>24</td>
<td>53.9</td>
<td>All Tarai + its adjoining districts</td>
</tr>
<tr>
<td>Kala-azar</td>
<td>12</td>
<td>29.7</td>
<td></td>
</tr>
<tr>
<td>Dengue</td>
<td>24</td>
<td>55.0</td>
<td></td>
</tr>
<tr>
<td>Chikungunya</td>
<td>24</td>
<td>55.0</td>
<td></td>
</tr>
<tr>
<td>Waterborne and foodborne</td>
<td>75</td>
<td>100</td>
<td>All districts</td>
</tr>
<tr>
<td>Noncommunicable diseases</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Department of Health Services, Nepal, 2013

All 11 Member States have submitted their intended nationally determined contributions (INDCs) to the UNFCCC. INDCs of all Member States have included health as one of the most vulnerable sectors to climate change. Bangladesh, Bhutan, Democratic People’s Republic of Korea, India, Maldives, Myanmar, Sri Lanka, Thailand and Timor-Leste have identified health adaptation as one of the priority actions in their INDCs. Indonesia and Nepal have not included or detailed health as a priority action.

Component 4 – Integrated risk monitoring and early warning

Integrated risk monitoring refers to the use of tools and epidemiological surveillance for early detection in conjunction with direct and remote sensing technologies for surveillance of the environmental determinants of health (e.g. water and air quality, variability in ambient temperature and humidity or incidence of extreme weather events). The overarching aim of this component is to use integrated disease surveillance and monitoring of a broad range of signals around a health risk

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1 Now it is known as Nationally Determined Contributions (NDCs)
and early warning systems to identify changing conditions more quickly to anticipate outbreaks and emergencies related to weather and climate.

Integrated surveillance for CSDs and climate data has been piloted along the riverine areas covering five districts in Bhutan. The country is now expanding such surveillance systems in eight other districts through 18 more sentinel sites.

Fig. 4. Map showing expansion sites for integrated disease and climate surveillance in Bhutan

![Map showing Expansion sites for Integrated Surveillance](source: Environment and Health Program, Ministry of Health, Bhutan]

The Democratic People’s Republic of Korea has initiated the development of climate sensitive disease and meteorological data surveillance.

The National Disaster Management Authority in India has developed a national heat-health action plan that is to be adopted by all states. To date, two states have implemented the action plan at the sub national level. In addition, India has conducted an in-depth review of its Integrated Disease Surveillance Programme and the country is now in the process of redesigning the Programme for timely reporting, analysis, and for better surveillance and response to climate-sensitive illnesses.

Sri Lanka has developed the final draft of the heat-health action plan. There is a good surveillance system for climate sensitive diseases such as dengue, leptospirosis, food borne and water borne diseases in Sri Lanka.

Thailand has developed an integrated risk monitoring and early warning system for extreme heat events, which is currently being piloted in communities. The MoH is also developing a 5-year public health action plan on heat, haze and drought conditions, including three measures, i.e. an information and surveillance system, prevention system, and treatment and emergency response system.

**Component 5 – Health and climate research**
Building climate resilience calls for both basic and applied research so as to reduce uncertainty about how local conditions may be affected, gain insight into local solutions and capacities, and build evidence to strengthen decision-making. The objectives of this component are (i) to identify and agree on a multidisciplinary national research agenda on climate change and health, (ii) to provide support for developing research capacity and (iii) to disseminate research findings to policy-makers for taking action.

Several research studies have been carried out in the Region. Bangladesh has completed a cluster randomized intervention trial on a child-centred approach to climate change and health adaptation through schools, a baseline cross-sectional survey on climate change and health, and a knowledge and perception study about climate change and human health among vulnerable communities. A study on the effects of climate variability, seasonal variations and environmental events on drinking water quality, diarrhoea prevalence and water, sanitation and hygiene (WASH) behaviour is ongoing in the country.

The Democratic People’s Republic of Korea has conducted a study on the relative change in air pollution compared with climate change, and identification of parameters for quantitative and qualitative analysis of water contamination.

In India, the Department of Science and Technology in association with the Department of Health Research has completed eight research projects on climate change and human health in the following three thematic areas – vector-borne diseases, air pollution and health, and heat stress and health during 2013–2016.

Sri Ramachandra University, a WHO collaborating centre on environmental and occupational health, has recently published two research papers – one on occupational heat stress profiles in selected workplaces in India and another on the social implications of occupational heat stress on migrant workers engaged in public constructions: a case study from southern India.

Nepal has completed a study to assess effects of climatic factors on diarrhoeal diseases at national and subnational levels; and two studies – longitudinal observation study on the effectiveness of existing household and community-level WASH interventions on health vulnerability to climate in Jiri; and an assessment of the health effects of cold waves in Nepal – are ongoing.

Fig. 5. Water quality data collection in Nepal
Thailand has conducted health related research on climate change from district to the national level. It includes research on the health risks of climate change, caused by vector- and waterborne diseases; morbidity and mortality associated with high ambient temperatures; the associations between heat stress and occupational injuries, mental health impacts and well-being; and a study is underway to understand the relationship between air pollution, heat and health effects in urban areas, and another study on the health economic impact of heat and air pollution in urban areas.

Sri Lanka has carried out a study to analyse the effects of meteorological factors on dengue incidence; a study to understand the correlation between dengue and weather in Kandy City; and a retrospective study on climatic factors and the occurrence of dengue fever, dysentery and leptospirosis in Sri Lanka between 1996 and 2010.

Component 6 – Climate-resilient and sustainable technologies and infrastructure

The objectives of this component are to ensure that (i) climate risks are systematically considered when dealing with technologies, products and procedures for health infrastructure and services, (ii) new technologies, processes and products are selected and promoted keeping in mind climate resilience and (iii) the sustainability of health operations is promoted and enhanced to build climate resilience and contribute to long-term sustainability. The former includes ensuring that health facilities are able to withstand current and projected future climate risks by proper design and appropriate siting. It also includes consideration of the climate resilience of services such as water, sanitation and electricity supply, which may be disrupted during extreme weather events. These events may influence the effectiveness of specific medical products and vaccines. For example, antidepressants, antihistamines, antipsychotics and diuretics may predispose their users to heat stroke or heat stress when temperatures are high. Selection of medical technologies and devices with a lower environmental footprint can also contribute to climate resilience and sustainability.

Bangladesh has developed a strategy on the “green hospital” initiative, which will be piloted when resources become available.

The Democratic People’s Republic of Korea is developing and implementing plans on greening health facilities, focusing on the use of renewable energy such as geothermal and solar energy, and planting trees around the facilities. The MoH is also collaborating with industrial technical sectors in minimizing carbon emissions, and treating and recycling waste water.
India is in the process of revising its Indian Public Health Standards in light of the national action plan for climate change and human health to include elements for building climate-resilient and climate-friendly health systems.

Maldives has developed health emergency response plans in eight facilities, and drills have been conducted. There are plans to expand such exercises in seven more facilities. The country has also conducted a feasibility assessment for solar power in all health facilities in the Laamu Atoll.

Nepal is promoting non-burn technologies for treating health-care waste in health-care facilities. The country has plans to improve the climate resilience of health-care facilities.

Sri Lanka has developed a sectoral policy on “cleaner production” and introduced the “green hospital” concept to minimize GHG emissions from the health sector. The MoH has also introduced environmentally friendly technologies for waste management and clean energy in some health-care facilities.

Reduction of GHG emissions from hospital activities is being undertaken in Thailand through its GREEN and CLEAN hospital initiative. To date, about 4736 hospitals are participating in this initiative.

**Component 7 – Managing the environmental determinants of health**

Climate change threatens health through environmental determinants such as air and water quality, water availability, food and nutrition security, housing and waste management. For this reason, the overarching aim of this component is to strengthen the role of the health system in identifying and managing the environmental determinants of health through public health prevention programmes in collaboration with other sectors that impact health such as industry, energy, transport, water, agriculture and municipalities. The objectives of this component are (i) to ensure joint monitoring of climate-sensitive environmental risks against evidence-based standards, (ii) to promote the creation, revision and enforcement of regulatory policies protecting populations against climate-sensitive environmental risks, and (iii) to enhance coordinated management of the environmental determinants of health, with clear roles and responsibilities defined across sectors.
Eight countries in the South-East Asia Region have established air quality standards for PM2.5. India, Nepal and Thailand have initiated monitoring of ambient air quality with engagement of the health sector. All Member States have included household air pollution actions in their noncommunicable disease action plans – although not all are implementing these, as the plans are largely unfunded.

Bangladesh and Nepal are piloting climate-resilient water safety plans as part of their project on health adaptation to climate change through resilient WASH.

Bhutan has piloted and is implementing climate-resilient WASH technologies such as revival of a drying spring source, which is the main water source for rural areas. Rooftop rainwater harvesting, constructed wetland for sewage treatment and ecological sanitation for places that face water shortages are other measures.

Relevant national agencies, international organizations and NGOs have collaborated in the Democratic People’s Republic of Korea to develop solutions using new naturalized mineral water sources and underground water to cope with long-lasting extreme droughts.

Maldives has developed a health-care waste management policy and strategic plan (2016–2021), and health-care waste management is being implemented in three atolls.

**Component 8 – Climate-informed health programmes**

Climate variability and change will impact vector-borne and waterborne diseases. Extreme weather events will cause injuries, mental and occupational health issues, and damage health facilities. Therefore, the overarching aim of this component is to ensure that health policy, programming and operations are increasingly designed and implemented after taking into account both current climate variability and future climate change. In line with the objectives of this component, health programmes can become climate resilient by using information about current and future climate conditions to identify capacity gaps and inform policy, strategic investment and planning decisions. Furthermore, climate-informed programming will continually review and adjust service delivery according to new information in order to respond to climate risks.

The vector-borne disease programme in Bhutan is working with the Environmental Health Unit to expand vector surveillance in nonendemic areas.

In India, the national vector-borne disease control programme is working towards malaria elimination by 2030, and control and elimination of other vector-borne diseases for which climate variability is included as an inbuilt risk factor adaptation.

Some climate factors are considered in the prevention and control of dengue programme in Maldives, Sri Lanka is taking a climate-informed approach to their dengue control programme. The country has eliminated malaria, however continuous surveillance is ongoing.

**Component 9 – Emergency preparedness and management**

Climate-informed preparedness plans, emergency systems and community-based disaster and emergency management are essential for building climate resilience. In this regard, it is important that health systems and communities aim to holistically manage overall public health risks and emphasize preparedness in addition to the usual focus on emergency response. Thus, the objectives for this component are to ensure that (i) emergency and disaster risk management protocols and policies include current and likely future climatic conditions, (ii) health system capacity is strengthened to manage risks so that overall vulnerability and exposure to hazards are reduced, and
residual risks and uncertainties are effectively managed and (iii) communities are empowered to effectively prevent and respond to the health risks posed by extreme weather events.

Bhutan has prepared a health sector emergency contingency plan. In order to understand a real situation and the health sector response, disaster management simulation and drills have been conducted in 14 hospitals. The MoH has also developed standard operating procedures for WASH in emergencies; it conducted three simulation exercises and engaged relevant stakeholders.

The Democratic People’s Republic of Korea is working to improve preparedness of health facilities through timely risk assessment to preventing or minimize the impacts on infrastructure and health services during extreme weather events, floods and landslides.

In Sri Lanka, a disaster management unit has been established in the health sector. It has developed guidelines in dealing with disasters such as floods and landslides. A diploma course for Medical Doctors is being conducted and district level focal points for disaster management for the health sector have been identified throughout Sri Lanka.

In Thailand, there is the Emergency Medical System for disaster preparedness and response developed in collaboration between health sector and other agencies such as the National Disaster Warning Centre and Department of Disaster Prevention and Mitigation, Ministry of Interior in preparing emergency response plan for extreme weather events such as floods, drought and heat.

**Component 10 – Climate and health financing**

The objective of this component is to identify, propose and monitor the additional funds required to develop health system resilience to climate change. Examples of additional funding required include the need to employ additional resources to expand geographical or seasonal ranges or population coverage for surveillance and control programmes for CSDs, or retrofitting of health-care facilities to withstand extreme weather events.

Resource requirements can be assessed through preparation of budgets for interventions selected in the previously described components, and compared with existing budget and funding resources to identify shortfalls that need to be addressed through mobilization of new resources. For those countries that have prepared HNAPs, the budgets developed for HNAPs can be used to identify resource gaps.

A comprehensive approach to financing health protection from climate change will first build on core investments in the health sector, such as investments to ensure adequate numbers of trained health personnel and basic health infrastructure and services, which also help to address climate change risks. This can be from national resources or external donors.

The objectives of this component include (i) development of health-specific funding mechanisms and climate change considerations included in proposals funded by health funding mechanisms, (ii) funding made available for sectors influencing health by incorporating health and climate change considerations in projects and programmes and (iii) availability and accessibility of climate change funding streams at the national level.

Funding is an issue for most countries due to competing health priorities that countries have to address. Some progress has been made in countries such as Bangladesh, Bhutan, Maldives, Nepal and Sri Lanka where external funds were mobilized. Financial resources were identified as one of the
challenges in addressing the impacts of climate change on health. Hence, there is a need to advocate it within countries as well as support countries in mobilizing funds from global funding mechanisms. Member States have been requesting WHO to expedite its process of getting accredited by the Green Climate Fund so that countries can then access funds for health adaptation through WHO.
4. **ACTION FRAMEWORK IN BUILDING HEALTH SYSTEMS RESILIENCE TO CLIMATE CHANGE**

**General objective**

To provide a roadmap for implementing the Male’ Declaration on Building Health System Resilience to Climate Change.

**Specific objectives**

1. To provide a conceptual structure for Member States of the South-East Asia Region to develop national specific action plans;
2. To provide a platform for cross-sectoral collaboration, including to promote the engagement and contribution of global, regional and national development partners, academic and civil society organizations in supporting Member States of the Region in their effort to build health systems resilience to climate change, as well as for financial and technical resource mobilization.

**Concept**

The operation time frame for this Framework is set at 5 years – between 2017 and 2022. With a set of indicators integrated, progress in implementing the Male’ Declaration and this Framework will be reported to the Seventy-fifth Regional Committee in 2022.

Based on the WHO Operational framework for building climate-resilient health systems, the Framework describes four subjects for each of the 10 action components.

1) Deliverables after a 5-year timeline
2) Actions for Member States
3) Actions by WHO (country offices, regional office and headquarters)
4) Agreed approaches, which is the preferable method of working together

**Regional indicators**

Proposed indicators for this Framework were developed, in consultation with Member States, to be the agreed modality for monitoring the progress of implementation. The concept of meaningful and proxy indicators, as well as the alignment with SDG indicators, were applied to minimize the burden of reporting to Member States.

1) Number of countries with a designated focal point (individual/agency) on CC&H
2) Number of countries that have developed and implemented an HNAP
3) Number of countries with an HNAP integrated to the NAP
4) Number of countries that have updated health vulnerability and adaptation assessment
5) Number of countries with showcases of climate-resilient health-care facilities
6) Number of countries that have developed integrated disease surveillance and early warning for at least three CSD/conditions
7) Number of countries with a communication strategy to raise awareness on CC&H
### Table 4. Deliverables and actions

<table>
<thead>
<tr>
<th>Components</th>
<th>Deliverables</th>
<th>Actions for countries</th>
<th>Actions for WHO</th>
<th>Agreed methods</th>
</tr>
</thead>
</table>
| 1 Leadership and governance       | Competent and functional climate change and health (CC&H) unit in each country | - Strengthen CC&H unit with focal point and budget.  
- Develop coordinating platforms for CC&H focal point to other climate-sensitive programmes and health-determining sectors (such as water, environment, agriculture, energy). | - Provide training to CC&H focal points.                                                                | - Seek global, regional and national experts as needed.  
- Engage all relevant sectors such as water, environment, agriculture, meteorology, emergency and relevant health programmes in the development of the HNAP.  
- Use local evidence, including vulnerability and adaptation assessment (V&A) findings, in preparing the HNAP.  
- Refer to WHO guidance on HNAP development.  
- Link HNAP development/revision with national adaptation plan (NAP). |
| Updated HNAP                      |                                                                              | - Develop/revise health national adaptation plan (HNAP).                                                    | - Provide guidance in development/revision of the HNAP.                                              |                                                                                  |
| 2 Health workforce                | Health professionals with better awareness and understanding on CC&H (both at executive and operational levels) | - Advocate on climate and health for policy-makers.  
- Provide in-service training for selective health workforce on CC&H.  
- Integrate climate and health modules in existing curricula/courses such as community medicine and public health.  
- Develop and implement a | - Continue advocacy on CC&H at global, regional and national levels.  
- Update regional training modules.                                                                 | - Use regional training modules and adapt them into national modules as per need.  
- Develop effective communication tools.                                                                   |
<table>
<thead>
<tr>
<th>Components</th>
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<th>Actions for WHO</th>
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</thead>
<tbody>
<tr>
<td>3 Vulnerability, capacity and adaptation assessment</td>
<td>Health V&amp;A developed and reported for each country</td>
<td>Develop/update health vulnerability assessment.</td>
<td>Develop regional pool of expertise (individual/institution) on climate and health.</td>
<td>Use WHO guidance documents and expert judgement of local staff when data are not available.</td>
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<td></td>
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<td></td>
<td>Designate at least one regional institute as WHO collaborating centre on climate and health.</td>
<td>Involve other ministries such as environment, water, agriculture, energy as needed.</td>
</tr>
<tr>
<td>4 Integrated risk monitoring and early warning</td>
<td>Early warning system developed, for at least three country-selected CSDs</td>
<td>Prioritize at least three CSDs and develop integrated monitoring system with climate data.</td>
<td>Identify experts to support countries in analysis of health and climate data in order to develop/strengthen early warning system.</td>
<td>Learn from other countries that have already piloted such a system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prepare health risk maps for the selected three CSDs.</td>
<td></td>
<td>Work closely with meteorology units and CSD programmes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pilot-test early warning system for these CSDs.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Develop and implement effective risk communication strategy for the health issues of concern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Health and climate research</td>
<td>Climate and health research initiated in countries</td>
<td>Set up national research agenda on CC&amp;H through participatory process.</td>
<td>Facilitate south–south cooperation on climate and health research or exchange of experience.</td>
<td>Conduct research on effectiveness of adaptation and mitigation interventions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Facilitate access to meteorological data and develop capacity for conducting research on health impacts and effectiveness of adaptation measures.</td>
<td>Develop and support SEA Region CC&amp;H research network.</td>
<td>Collaborate with academia and research institutes.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Prioritize research topic and conduct research process, with focus on the identified knowledge demands in policy</td>
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<tr>
<td>Components</td>
<td>Deliverables</td>
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<td>Actions for WHO</td>
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<tr>
<td></td>
<td></td>
<td>• Establish/strengthen and support research networks, within and across country.</td>
<td>• Develop a guidance tool for assessing the vulnerability of health-care facilities to climate change.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Integrate research dissemination in the broader communication strategy, including promoting research–policy linkage.</td>
<td>• Document and disseminate the good practices in the Region.</td>
<td></td>
</tr>
<tr>
<td>6 Essential medical products and technologies</td>
<td>Vulnerability of health-care facilities identified by countries</td>
<td>• Formulate and implement plans of action to promote climate-resilient health facilities, including 1) assess vulnerability of health-care facilities to climate risks and implement interventions to make them resilient to climate change (retrofitting to make them safe from various climatic hazards such as flooding, storms); 2) ensure that new health-care facilities incorporate climate risks in their building design and siting is in safe areas; 3) implement sustainable and environment-friendly products and services in health-care facilities</td>
<td>• Learn from countries that have already initiated green hospital concepts. • Work with responsible agencies for designing hospitals and health-care facilities. • Work with hospital or health-care facility maintenance to improve efficiency of energy, water and waste management. • Work with procurement units for drugs /equipment to encourage green procurement.</td>
<td></td>
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<tr>
<td>Components</td>
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<tr>
<td>7 Management of environmental determinants of health</td>
<td>Integrated air quality monitoring developed</td>
<td>• Strengthen existing monitoring system for air quality and link with disease surveillance for promoting cross-sectoral action.</td>
<td>• Develop and promote the use of tools for integrated monitoring of air quality and health data.</td>
<td>• Partner with meteorology department as this is important for accessing climate and air quality data.</td>
</tr>
</tbody>
</table>
| | Water safety plan strengthened | • Strengthen water quality monitoring system and capacity.  
• Implement climate-resilient water safety plans in both health-care facilities and communities. | • Develop guidance for climate-resilient water safety plans. | • Build on existing system of water quality monitoring, surveillance and water safety planning. |
| 8 Climate-informed programmes | Climate risks included in planning and implementation of CSD programmes | • Develop risk map for CSDs using geographical information systems (GIS).  
• Develop preventive measures for those most at risk based on risk maps.  
• Ensure climate change risks are considered in the planning and implementation process of CSD | • Develop tools to advocate for climate change risks to various CSD programmes.  
• Support Member States to develop/update risk maps for selected areas. | • CC&H focal point should work closely with the CSD programmes and advocate for climate risks to be included, and ensure that adaptation measures are implemented. |
<table>
<thead>
<tr>
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<th>Actions for countries</th>
<th>Actions for WHO</th>
<th>Agreed methods</th>
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<tr>
<td>9 Emergency preparedness and management</td>
<td>Climate risks included in disaster risk management plans</td>
<td>• Include climate-sensitive health risks in national disaster risk reduction strategy or plans.</td>
<td>• Liaise with WHO emergency team to include climate risks in their risk reduction plans and programmes.</td>
<td>• Organize a local-level coordination body involving community-based organizations, NGOs, and community groups to determine risks, prevent exposure and take action to save lives in extreme weather events.</td>
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<td>• Include climate risks in emergency preparedness and response plans for health facilities.</td>
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<td>• Prepare contingency plan for extreme weather event management.</td>
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<tr>
<td>10 Climate and health financing</td>
<td>Funds mobilized for adaptation and mitigation measures</td>
<td>• Conduct needs assessment and resource monitoring exercises for CC&amp;H.</td>
<td>• Facilitate development of regional/subregional/country-specific proposals and submission to potential funding agencies.</td>
<td>• Identify co-benefits in working with CSD programmes, emergency programmes and health-determining sectors.</td>
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<td>• Develop resource mobilization plan/strategy (domestic and external) with proactive role of the health sector.</td>
<td>• Develop tool for tracking finance in climate and health work.</td>
<td>• WHO to follow up to become an accredited agency of Green Climate Fund.</td>
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<td>• Conduct sensitization and advocacy exercises within and outside the health sector for allocation of resources to address climate risks.</td>
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<td>• Develop quality CC&amp;H proposals for development partners, preferably on co-financing basis.</td>
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REFERENCES


