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**Nairobi work programme on impacts, vulnerability and  
adaptation to climate change**

### **Human health and adaptation: understanding climate impacts on health and opportunities for action**

**Synthesis paper by the secretariat**

#### *Summary*

Climate change presents a risk to health in a variety of ways. The health risks resulting from climate change impacts in countries are changing and the interlinkages between health, climate change and other drivers of global environmental changes are complex and need to be better understood. A large number of activities ranging from policies that are planned and implemented by governments, to various actions undertaken by intergovernmental organizations, non-governmental organizations and communities are already under way in order to address climate change impacts on health. However, a number of challenges, particularly with regard to awareness and education, as well as planning, capacity and financial mechanisms continue to limit action on the ground.

In order to better protect human health from the impacts of climate change, numerous collaborative actions need to be implemented. During the 10<sup>th</sup> Focal Point Forum of the Nairobi work programme on impacts, vulnerability and adaptation to climate change, which focused on health and adaptation, Parties, partner organizations and experts discussed a range of collaborative actions to protect health from the impacts of climate change and to develop resilient health systems.

This document provides a synthesis of information on the impacts of climate change on human health, and on emerging activities, challenges and opportunities for collaborative climate action, including under the Nairobi work programme on impacts, vulnerability and adaptation to climate change. It is based on the information submitted by Parties, partner organizations and other relevant organizations, and inputs from participants during and after the 10<sup>th</sup> Focal Point Forum on health and adaptation.

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## I. Introduction

### A. Scope of the work

1. This document provides a synthesis of information on the impacts of climate change on human health, and emerging activities, challenges and opportunities for collaborative climate action, for consideration at the forty-sixth session of the Subsidiary Body for Scientific and Technological Advice (SBSTA). The synthesis paper is based on the information provided by Parties, partner organizations and relevant organizations in the submissions and inputs received from participants during and after the 10<sup>th</sup> Focal Point Forum, for consideration at SBSTA 46.
2. The secretariat would like to acknowledge the valuable inputs and feedback provided by the 10<sup>th</sup> Focal Point Forum participants in the preparation of this document.<sup>1</sup>
3. Following an outline of the scope of the work, chapter I covers the mandate and role of the Nairobi work programme on impacts, vulnerability and adaptation to climate change (NWP) in advancing action on knowledge to address health. Chapter II provides information on the key results of the synthesis based on information contained in chapters III–V. Drawing on the submissions, the keynote presentation by a representative of the World Health Organization (WHO), discussions at the 10<sup>th</sup> Focal Point Forum, and subsequent input provided by forum participants, chapter III provides key findings on the impacts of climate change on human health and action to protect human health. Chapter IV highlights key ideas and proposals that have emerged from discussions during the forum and inputs received after it, which could be considered as a basis for the possible next steps, including in the context of the NWP, followed by conclusions and next steps in chapter V.

### B. Mandate and role of the Nairobi work programme in advancing action through knowledge

4. Recognizing the emerging risks related to the impacts of climate change on human health, Parties agreed to undertake concrete activities addressing health under the NWP in order to inform adaptation planning and actions at the regional, national and subnational levels<sup>2</sup> (see annex I for background information on the NWP).
5. In response to the mandate, the secretariat undertook the following activities under the NWP to advance action through knowledge in order to address human health (see figure 1):
  - (a) As a first step, the secretariat undertook a mapping exercise to identify health experts and expert institutions, and contacted these experts and institutions as well as NWP focal points and UNFCCC focal points requesting them to share their experience and expertise through submissions. As a result of this initiative, submissions<sup>3</sup> were received from 14 Parties, a group of Parties and 12 relevant organizations (including 8 NWP partner organizations), and focused on recent work in the area of climate change impacts on human

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<sup>1</sup> The SBSTA requested the secretariat to prepare, in consultation with Focal Point Forum participants, this synthesis paper (FCCC/SBSTA/2016/4, para. 14).

<sup>2</sup> FCCC/SBSTA/2016/2, paragraph 15(a).

<sup>3</sup> Submissions from Parties are available at <http://www4.unfccc.int/submissions/SitePages/sessions.aspx?showOnlyCurrentCalls=1&populateData=1&expectedsubmissionfrom=Parties&focalBodies=SBSTA> and submissions from NWP partner organizations and other relevant organizations are available at <http://unfccc.int/7482>.

health, including: (1) changes in the geographical distribution of diseases; (2) new and emerging health issues, including tropical diseases and their impacts on social and economic structures, as well as the issues of malnutrition, waterborne diseases, vector-borne diseases and disaster impacts; and (3) the effects of climate change on health and productivity in the workplace, with implications for occupational health and safety and social protection (see annex II for an overview of the submissions);

(b) The second step involved:

(i) Reviewing the submissions in order to distil key findings to inform the 10<sup>th</sup> Focal Point Forum;

(ii) Designing the forum;

(iii) Following up with key health experts based on their submissions for their participation and inputs during the forum;

(c) The third step was the 10<sup>th</sup> Focal Point Forum, which was aimed at fostering learning and dialogue among Parties and health experts to enable them to discuss actions addressing health (see annex III for information on the proceedings of the forum);

(d) The fourth step, in response to the mandate referred to in paragraph 4 above, is the preparation of this synthesis paper, which was undertaken in a collaborative manner with inputs from participants in the 10<sup>th</sup> Focal Point Forum;

(e) The final step will be when Parties discuss and consider this synthesis paper at SBSTA 46. Further opportunities could present themselves under the NWP for fostering policy–science–practice collaboration in order to facilitate actions to reduce climate risks on health and enhance overall resilience of health systems.

Figure 1

**Five-step process on health and adaptation under the Nairobi work programme**



*Abbreviations:* SBSTA 46 = forty-sixth session of the Subsidiary Body for Scientific and Technological Advice, WHO = World Health Organization.

## II. Summary of the key findings

6. **Climate change presents a risk to health in a variety of ways.** The impacts of climate change on health are already evident, and will become increasingly prevalent. The significant risks of climate change to health include direct effects (such as general warming leading to heat-related mortality and increased disease transmission) and indirect effects

(such as climate change impacts on food production, migration rates and the ability of people to work in extreme weather conditions).

7. **The health risks and impacts of climate change in countries are changing.** Some of these include changes in the geographical distribution/pattern of diseases (such as malaria and dengue); new and emerging health issues, including heatwaves and other extreme events; and the subsequent impacts on social and economic structures.

8. **The issue of health and climate change is complex, with many interlinked aspects.** As an example, an increase in heatwaves creates health issues for workers in certain industries but will also negatively impact both water quality, which will lead to the spread of some diarrhoeal diseases, and water quantity, which will affect food security and contribute to malnutrition and undernutrition. Furthermore, it is important to better **understand and address the interlinkages between climate change and other drivers of global environmental change** such as social and economic conditions, biodiversity loss and ecosystem disruption, while addressing the effects of climate change on human health.

9. **A large number of activities ranging from policies that are planned and implemented by governments, to various actions undertaken by intergovernmental organizations, non-governmental organizations and communities are already under way so as to address climate change impacts on health.** While recognizing the need to build on these ongoing adaptation and climate resilience actions, countries need to strengthen the resilience of their health systems and climate-proof the infrastructure that provides essential services (e.g. water, sanitation and hygiene) in order to make communities more resilient.

10. However, **there are a number of challenges in advancing climate action to address health risks in countries.** These include the availability of, and access to, funding for health and adaptation. For example, WHO reported that an extremely small percentage of climate change adaptation funds is being allocated to health projects. There is also inadequate integration of health into adaptation plans and development strategies.

11. Parties and experts proposed **various actions involving collaboration among different actors, including national and subnational governments, and non-Party stakeholders such as WHO and relevant expert institutions, medical universities/schools, research and scientific communities and relevant constituted bodies and workstreams, such as the NWP, under the UNFCCC process.** Such actions fall into the following clusters:

- (a) Enhancing research and health information systems;
- (b) Adopting a comprehensive approach to integrating health into climate change adaptation plans, projects and programmes and to combining climate change with other determinants and drivers of health-care systems;
- (c) Developing the capacity of the health-care workforce and educational institutions in order to develop climate-resilient health-care systems;
- (d) Strengthening intersectoral action and multilevel governance;
- (e) Promoting climate-resilient and sustainable health infrastructure and technologies;
- (f) Scaling up financial investments/flows towards adaptation plans and actions addressing health.

### III. Key findings on the health impacts of climate change, current practice, opportunities and challenges

12. Drawing on the submissions, the keynote presentation by WHO, discussions at the 10<sup>th</sup> Focal Point Forum, and subsequent input provided by forum participants, this chapter provides key findings under the following areas:

- (a) Impacts of climate change on human health;
- (b) Action to protect human health: current practice, opportunities and challenges.

#### A. Impacts of climate change on human health

13. This subchapter first describes the relationship between human health and climate change. Subsequent subchapters provide key findings on climate change impacts on human health under the following topics<sup>4</sup> (see annex IV for an overview of tools and methods for vulnerability and impact assessment, planning and implementation, and monitoring and evaluation, addressing health referred to in submissions):

- (a) Changes in the geographical distribution of diseases;
- (b) New and emerging health issues, including tropical diseases and their impacts on social and economic structures;
- (c) Issues of malnutrition, waterborne diseases, vector-borne diseases and disaster impacts;
- (d) The effects of climate change on health and productivity in the workplace, with implications for occupational health, safety and social protection.

##### 1. The relationship between human health and climate change

14. Climate change is a common concern for human health and well-being. As a part of a broader system, climate change interacts and interferes with environmental and social conditions and infrastructure, and can amplify the adverse impacts of climate change on the health of people in all areas of the world. It is therefore important to understand and consider achieving better integration between climate change and other drivers of global environmental changes such as social and economic conditions, habitat loss, land degradation and ecosystem disruption, while addressing the impact of climate change on human health.

15. **The impacts of climate change on human health are already evident, and will become increasingly prevalent.** Climate change affects health through three pathways: (1) directly through weather variables (such as heat and storms); (2) indirectly through natural systems such as disease vectors; and (3) through pathways heavily mediated by human systems such as undernutrition (see figure 2)<sup>5</sup> Climate change and its impacts, including heat, precipitation, floods and storms, among others, and interaction with mediating factors such as environmental conditions, social infrastructure, public health capability and adaptation measures lead to a range of health impacts. These interactions are also referred to in the submissions, which mention particular sets of vulnerabilities to climate change, and the different mediating factors that combine to create health impacts on the ground. As

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<sup>4</sup> FCCC/SBSTA/2016/2, paragraph 15(a)(i).

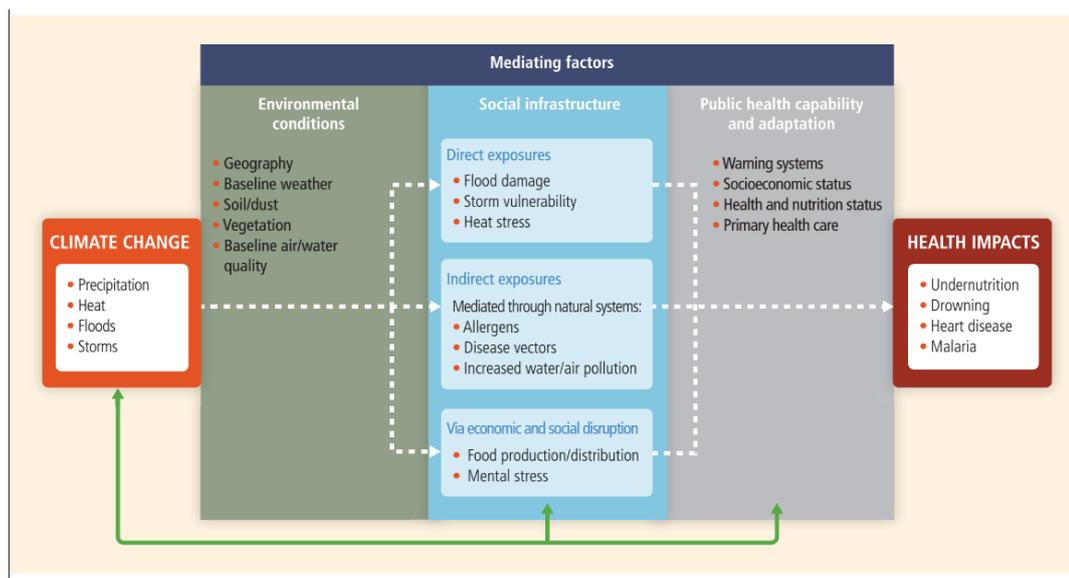
<sup>5</sup> Information from the WHO keynote presentation delivered during the 10<sup>th</sup> Focal Point Forum.

a result of the complexity of these interactions, there is no ‘one size fits all’ approach to health adaptation.

16. Many of the significant risks of climate change on health include direct effects such as general warming leading to heat-related mortality and increased disease transmission; and indirect effects such as climate change impacts on food production and migration rates, and the ability of people to work in extreme weather conditions. By 2030, conservative projections include worsening undernutrition, malarial and diarrhoeal diseases, and heat mortality.

Figure 2

### Three primary exposure pathways by which climate change affects health



Source: Field CB, Barros VR, Dokken DJ, Mach KJ, Mastrandrea MD, Bilir TE, Chatterjee M, Ebi KL, Estrada YO, Genova RC, Girma B, Kissel ES, Levy AN, MacCracken S, Mastrandrea PR and White LL (eds.). 2014. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Available at <https://www.ipcc.ch/report/ar5/wg2/>.

17. **Climate change is expected to exacerbate health problems that already pose a major burden to vulnerable populations.** The climate change and health findings of the contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change<sup>6</sup> show that the effect of climate change on health is significant and negative. Conservative estimates of projected health impacts from 2030 onwards lead WHO to expect that climate change will significantly exacerbate many health issues in the future, including undernutrition, heat mortality, and vector-borne and waterborne diseases.<sup>7</sup>

## 2. Changes in the geographical distribution of diseases; and new and emerging health issues and their impacts on social and economic structures

18. **Climate change lengthens the transmission season and expands the geographical range of many diseases.** Even with optimistic economic growth, at the global level, climate change will increase risks especially for the most vulnerable

<sup>6</sup> *Climate Change 2014: Impacts, Adaptation, and Vulnerability*. Available at <https://www.ipcc.ch/report/ar5/wg2/>.

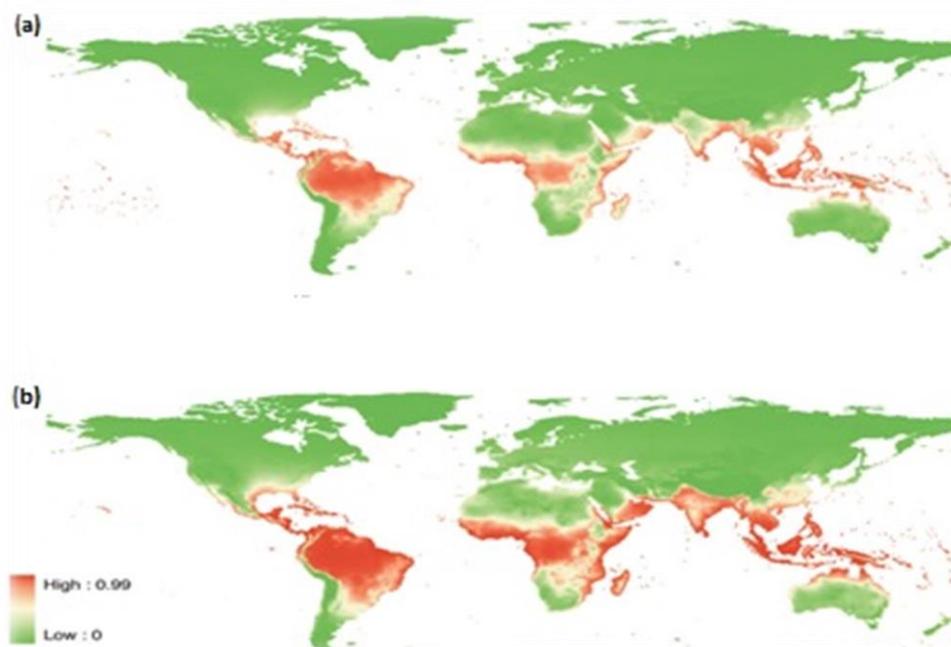
<sup>7</sup> Information from the WHO keynote presentation delivered during the 10<sup>th</sup> Focal Point Forum.

populations. In the majority of submissions, the changing geographical spread of diseases was highlighted as a significant concern. Examples include diseases moving northwards in the northern hemisphere due to rising temperatures and changing rainfall patterns, or appearing in tropical areas that are subject to devastating extreme events.

19. Studies have shown that **disease determinants such as human density and human fluxes are also important in disease spatial distribution and expansion**. The focus for vector-borne diseases has been mostly on the actual and predicted insect spatial distribution, and not the disease case distributions, while the latter should also be taken into account. For example, the conditions for dengue transmission are likely to expand significantly across the globe, as illustrated in figure 3. Section (a) of figure 3 shows the areas conducive to dengue transmission in 1990 and section (b) shows how such areas could expand as a result of climate change in the 2080s. The transmission of diseases will not automatically occur if public health interventions are utilized to protect populations, but their transmission will become easier as a result of climate change.

Figure 3

**Changing patterns of infectious disease: dengue transmission**



*Source:* Based on data from Hales S, de Wet N, Maindonald J and Woodward A. 2002. Potential effect of population and climate changes on global distribution of dengue fever: an empirical model. *Lancet*. 360: pp.830–834.

*Notes:* (1) Section (a) shows dengue fever transmission in 1990; (2) Section (b) shows projected expanded distribution of dengue fever in the warmer, wetter and more humid conditions expected in the 2080s, assuming no change in non-climatic determinants of dengue distribution.

20. While it is essential that **the public health sector is aware of the possibility of unpredicted ‘shocks’, it is also important to undertake a full diagnosis to understand the factors (excluding climate change) contributing to emerging diseases**. As an example presented by WHO, towards the end of 2015 the first reports were made of a severe outbreak of the Zika virus and symptoms in unborn babies. Without sufficient research, it is not possible to attribute such health shocks entirely to climatic factors; however, it was notable that at the time, climatic conditions in the regions affected were

highly unusual and conducive to the spread of the disease. From this example, it was noted that the environmental suitability of the Zika virus mirrors tropical and subtropical region distribution. For instance, two states in the United States of America, Florida and Louisiana, harbour subtropical conditions, with a mixed biological diversity. As a result, it could be seen that environmental suitability for the Zika virus and its vector mimics the actual ecosystem and biome distribution.

21. **The socioeconomic cost of health problems caused by climate change is considerable, and certain groups are more highly impacted by climate-sensitive diseases and other health impacts.** These groups can include children, the elderly, people infected with the human immunodeficiency virus, migrants, indigenous peoples, people living in poverty, and women (in particular pregnant women). For example, according to WHO, due to climate change, the spread of disease and increase in its transmission in areas where it already occurs is expected to lead to 48,000 additional deaths from diarrhoea and 60,000 from malaria, each year, by 2030. It has been well documented that pregnant women, due to the risk posed to their foetuses, are more vulnerable to the effects of the Zika virus.<sup>8</sup>

22. As one of the indirect ways climate change impacts health, **climate-induced human mobility**, which is on the rise, has a socioeconomic cost and can affect mental and physical health. It is estimated that 22.5 million people are displaced annually by climate or weather-related disasters, and these figures are expected to increase in the future. Heat extremes and other effects of climate change are predicted to impact where people can live, driving many to migrate both internally and internationally in search of livelihoods. Such movement is expected to create additional challenges such as vulnerability to disease and problems in accessing quality health-care services.

### 3. **Issues of malnutrition, waterborne diseases, vector-borne diseases and disaster impacts**

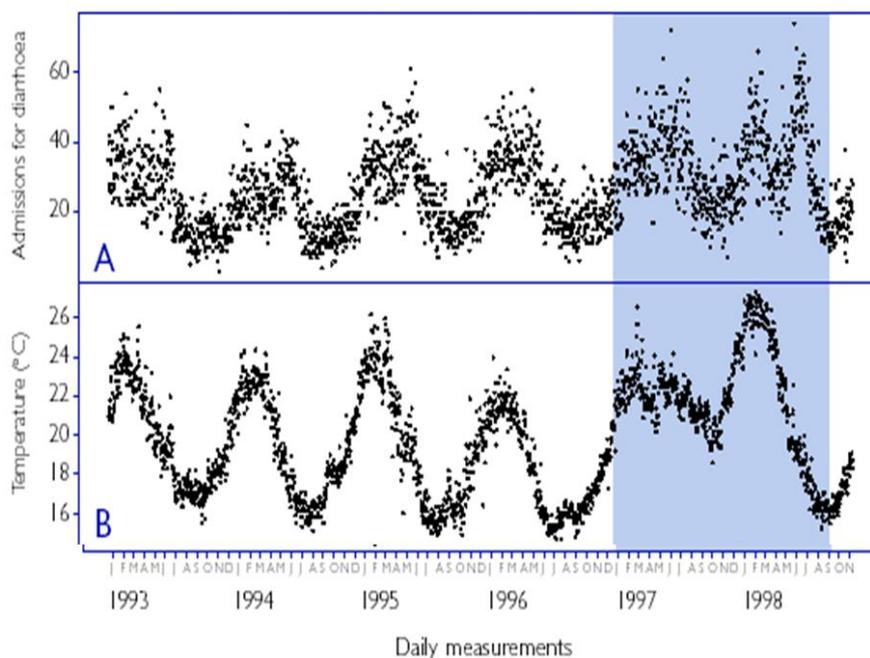
23. **Many infectious diseases, including those diseases spread by water, are highly sensitive to climate conditions.**<sup>9</sup> Figure 4 illustrates the correlation between temperature and diarrhoea. Section B of figure 4 shows daily observations of temperature in Lima in the 1990s. The area highlighted in blue indicates an El Niño event, in which the temperature was above average. Section A of figure 4 shows the number of children who were admitted to the main paediatric clinic in Lima with severe diarrhoea. A strong correlation can be seen between temperature rise and a rise in diarrhoeal disease from these data.

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<sup>8</sup> As footnote 7 above.

<sup>9</sup> As footnote 7 above.

Figure 4  
Sensitivity of diarrhoeal disease to meteorological conditions



Source: Checkley W et al. 2000. Effects of El Niño and ambient temperature on hospital admissions for diarrhoeal diseases in Peruvian children. *Lancet*. 355: pp.442–450.

Notes: (1) Section A of the figure shows daily admissions for severe diarrhoea at the main paediatric clinic in Lima; (2) Section B of the figure shows daily variations in temperature for Lima over the same period.

24. **The emergence of diseases and change in the geographical distribution of these diseases seems to be one of the key issues of concern requiring new and innovative actions.** Some of the key findings in relation to this are as follows:

(a) The emerging **vector-borne diseases** that are mentioned most frequently in submissions from countries in Asia, Africa and Latin America include those spread by mosquitos, particularly malaria but also dengue, West Nile fever, chikungunya, Ross River virus and the Zika virus. A predicted increase in leishmaniasis, carried by sandflies, was also mentioned. Concern was expressed about malaria in Europe, as the disease is predicted to spread geographically, or to re-emerge in areas where the threat had previously been removed through, for example, infrastructural changes and better sanitation;

(b) Numerous submissions, including those from the European Union and the Russian Federation, also mention diseases spread by ticks, particularly Lyme disease, but also tick-borne encephalitis, tularaemia and babesiosis;

(c) In relation to **waterborne diseases**, the main concern of both developed and developing countries was the increase in and increased geographical spread of diarrhoeal diseases. Submissions refer specifically to gastroenteritis, and to other waterborne diseases like cholera, typhoid and dysentery. There is a strong link between water and vector-borne diseases, given that many vectors live and/or breed in stagnant water, for example mosquitos (malaria, etc.) and snails (schistosomiasis, etc.). Poor-quality drinking water and a lack of access to water for sanitation have also been noted to lead to a large number of illnesses, including infections.

25. **Other climate-sensitive diseases** include meningitis, respiratory diseases (different types of influenza), zoonotic diseases (e.g. foot and mouth disease, and avian influenza), food-borne diseases (e.g. *Salmonella*), bacterial diseases and chronic diseases (e.g. cardiovascular disease and asthma). The effects of climate change on allergies were also noted. In addition, health issues that are not linked to diseases were mentioned and attributed to the impacts of climate change, including injuries, bacterial infections and mental health issues such as post-traumatic stress disorder. It was noted that there can be severe mental health impacts from displacement, loss of livelihood, loss of culture, etc.

26. **It can be expected that the diseases that are most sensitive to meteorological conditions are the ones that will be most affected by climate change, however the relationship is not always linear.** A vector species, for example, could benefit from more favourable conditions to its life cycle due to climate change but the parasite or virus that it harbours might not favour the same conditions. These multiple interactions therefore need to be taken into account when trying to understand the effects of climate change on climate-sensitive diseases. Conversely, some vectors might be less suited to their own changing habitats and thus their populations may decrease, providing fewer hosts for the parasites or viruses that use them during their life cycles.

27. **Malnutrition and undernutrition were highlighted as a concern for a number of developing countries in Africa, Asia and Latin America, which discussed the impacts of climate change on food security, particularly in relation to floods and drought.** Disaster impacts on food systems and the crises wrought thereby were a major concern. According to the World Bank report titled *World Development Report 2010: Development and Climate Change*,<sup>10</sup> malnutrition caused by unmitigated climate change could lead to 3 million additional deaths per year globally by the end of the century. The global impact results from the fact that climate change is likely to push up global food prices, leading to the exacerbation of malnutrition in both developed and developing countries.

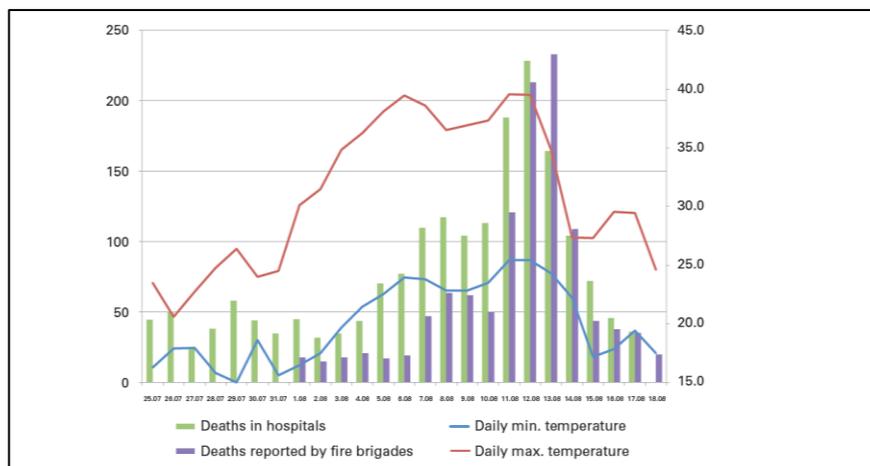
28. In terms of **disaster impacts**, in developing countries flooding emerged as one of the main concerns. In addition, drought was a significant concern, particularly in African countries. In developed countries the main extreme event that was mentioned was heatwaves. Numerous other disaster impacts were also mentioned, including wildfires, landslides and storms. The health issues linked to disasters are both physical (injuries, loss of life, loss of health infrastructure, etc.), disease-related and mental, due to the trauma caused.

29. WHO pointed out that, by the middle of this century, heat events that currently occur once every 20 years could occur once every 3 or 4 years. Climate stresses like heatwaves exacerbate existing stresses within communities, such as poverty. The elderly are usually the most negatively affected. The 2003 Paris heatwave was given as an example (see figure 5). There is a direct correlation between the hotter temperatures (indicated by a red line) and mortality (indicated by green and purple bars).

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<sup>10</sup> <https://openknowledge.worldbank.org/handle/10986/4387>.

Figure 5  
**Number of reported deaths and minimum and maximum temperatures in Paris during the heatwave in summer 2003**



Source: Based on data retrieved from the European Environment Agency website, originally published in 2009 under the section titled “Number of reported deaths and minimum and maximum temperature in Paris during the heatwave in summer 2003”. Available at <http://www.eea.europa.eu/data-and-maps/figures/>.

**4. Effects of climate change on health and productivity in the workplace**

30. Workers in certain sectors and industries, such as farmers, construction workers and those working in tourism and transportation are particularly vulnerable to the effects of climate change. **Heat stress can lead to lower productivity, unbearable working conditions and an increase in the risk of cardiovascular, respiratory and renal diseases.** WHO also noted the impact of humidity, in conjunction with temperature, on workers.

31. **Climate change impacts on people’s work can also lead to mental health problems,** such as depression. Suicide rates can increase when people are not able to work and provide for themselves and their families, for example in the agricultural sector. Some submissions noted that there is regional differentiation in this regard, with South Asia mentioned as a high-risk region.

**B. Action to protect human health: current practice, opportunities and challenges**

32. This chapter distils a summary of current experience with adaptation actions to protect human health (chapter III.B.1) and opportunities and challenges in advancing climate action addressing health (chapter III.B.2).

**1. Current experience with adaptation actions to protect human health**

33. In addition to consideration under the NWP, health is also addressed in other areas of work in the UNFCCC process:

(a) As one of the primary sectors when it comes to climate change impacts and adaptation solutions, health features in almost all the activities of **the Least Developed Countries Expert Group (LEG)**. It is included among the primary sectors/themes in activities on technical guidance, training, knowledge management and outreach. The

national adaptation programmes of action, for example, identify health as one of the priority sectors for implementing urgent and immediate adaptation actions;

(b) In the context of the **Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts**, non-economic losses are one of the key areas of cooperation for enhancing knowledge, action and support.<sup>11</sup> Health is one of the non-economic losses. Most of the related work has, to date, been undertaken in the context of action area 4 of the initial two-year workplan of the Executive Committee. WHO, collaborates in the implementation of the Warsaw International Mechanism, including by serving as a technical member of the expert group on non-economic losses;<sup>12</sup>

(c) The **Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE)** training materials are designed to facilitate the preparation of national communications by Parties not included in Annex I to the Convention in accordance with the relevant guidelines.<sup>13</sup> As part of its training materials on vulnerability and adaptation, it includes a module on human health, which covers methods that are commonly used in the health sector for vulnerability and adaptation assessment;

(d) The **Lima Adaptation Knowledge Initiative** – a joint action pledge of UN Environment and the secretariat under the NWP,<sup>14</sup> which seeks to identify and fill knowledge gaps at the subregional level, has highlighted a number of health-related knowledge gaps, including insufficient evidence-based knowledge and information on direct and indirect climate change impacts on health, a lack of awareness of the public and the media about climate change impacts on health, and adaptation measures.

34. **A large number of activities are already being implemented on the ground.** These activities range from policies that are planned and implemented by national and subnational governments, to various actions undertaken by intergovernmental organizations, non-governmental organizations and communities. For example, WHO highlighted that 35 health adaptation projects have been initiated on the ground in different countries within the last eight years by many organizations in collaboration with countries. Building on the progress made to date, countries now need to work towards developing resilient health systems, including strengthening existing structures that deal with health and enable wider access to basic essential services (e.g. water, sanitation and hygiene).

35. Various **research programmes and academic studies** are also under way that **improve the understanding of interlinkages between climate change and other drivers** of global change and health as well as those that assess the impacts of climate on human health. These programmes and studies include the following:

(a) Recent studies published by the Nepal Health Research Council in collaboration with Goethe University in Frankfurt, Germany, deal with climate change and the distribution of vector-borne diseases in the Hindu Kush-Himalayan region;<sup>15</sup>

(b) **Tools and algorithms have also been developed for assessing climate health risk assessments.** For example, the WHO report *Protecting Health from Climate*

<sup>11</sup> Further information on non-economic losses is available at <http://unfccc.int/9431.php>.

<sup>12</sup> <http://unfccc.int/9694.php>.

<sup>13</sup> <http://unfccc.int/349.php>.

<sup>14</sup> Details on the action pledge are available at <http://www4.unfccc.int/sites/nwp/Pages/Item.aspx?ListItemId=23181&ListUrl=/sites/nwp/Lists/MainDB>.

<sup>15</sup> [https://unfccc.int/files/parties\\_observers/submissions\\_from\\_observers/application/pdf/723.pdf](https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/723.pdf) and <http://nhrc.org.np/>.

*Change: Vulnerability and Adaptation Assessment* (2013)<sup>16</sup> assesses the influence of climatic factors and seasonal variability on health in order to calculate risk factors. It is designed to provide basic and flexible guidance on conducting a national or subnational assessment of current and future vulnerability to the health risks of climate change, and on designing policies and programmes that could increase resilience, taking into account the multiple determinants of climate-sensitive health outcomes. The Climate Adaptation Management and Innovation Initiative, a World Food Programme (WFP) initiative funded by the Government of Sweden, is another example of developing climate-induced food insecurity analyses and practices to inform programming and decision-making. The Climate Adaptation Management and Innovation Initiative's focus is 16 countries that span Asia, the Middle East, and Eastern, Central and Northern Africa.<sup>17</sup>

36. With regard to **data, information and knowledge on health and climate change**, the following findings have emerged:

(a) **Disease monitoring and epidemiological surveillance networks exist in some countries, including partnerships between the health sector and climate information services.** For example, the Tiger Mosquito Surveillance Network, implemented by the French Ministry of Social Affairs and Health, monitors the tiger mosquito's movements in France, as climate change makes the country more hospitable as a habitat;<sup>18</sup>

(b) **Data exchange web-based platforms and other knowledge-sharing initiatives are also emerging that provide information on health and adaptation.** For example, the adaptation knowledge portal under the NWP<sup>19</sup> provides information on case studies and tools on adaptation, including health; and Clim-Health Africa serves as a virtual hub where expertise is shared on climate change and health, in order to develop the capacity of African health and climate communities, institutions, practitioners and negotiators;<sup>20</sup>

(c) **Knowledge products are also available that aim to provide ministers of health, health decision makers and advocates with country-specific, evidence-based snapshots of the climate hazards and health risks facing countries.** The publication of knowledge products and impact reports, the WHO UNFCCC Climate and Health Country Profiles, provides a good example in this regard.<sup>21</sup>

37. With regard to **integrating health into plans, projects and programmes at different levels**, the following key findings have emerged:

(a) **Some countries integrate health into their national adaptation plans (NAPs) and programmes.** For example, the national health vulnerability, impact and adaptation assessment of climate change was carried out in the former Yugoslav Republic of Macedonia as part of a seven-country initiative of WHO and the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, entitled

<sup>16</sup> <http://www.who.int/globalchange/publications/vulnerability-adaptation/en/>.

<sup>17</sup> <http://www.wfp.org/climate-change/initiatives/c-adapt>.

<sup>18</sup> <http://social-sante.gouv.fr/sante-et-environnement/risques-microbiologiques-physiques-et-chimiques/especes-nuisibles-et-parasites/article/moustiques-vecteurs-de-maladies> and the reporting portal at [http://www.signalement-moustique.fr/signalement\\_albopictus/](http://www.signalement-moustique.fr/signalement_albopictus/).

<sup>19</sup> <http://www4.unfccc.int/sites/nwp/Pages/Home.aspx>.

<sup>20</sup> <http://www.climhealthafrica.org>.

<sup>21</sup> <http://www.who.int/globalchange/resources/countries/en/>.

“Protecting health from climate change in southeast Europe, central Asia and the Russian north”, implemented in the period 2009–2013;<sup>22</sup>

(b) **Organizations have also taken initiatives in supporting countries in formulating and implementing NAPs and undertaking health adaptation.** For example, WHO produced two supplements to the NAP guidelines in 2014<sup>23</sup> and 2015,<sup>24</sup> respectively, for supporting the national adaptation planning process;

(c) **There is also evidence of integrating health into other sector plans (e.g. water resources and infrastructure) and strategies such as disaster risk reduction in a way that strengthens a country’s national capacity to respond to climate change impacts on health.** For example, the Forecast-based Emergency Preparedness for Climate Risks project organized by WFP and funded by the German Federal Foreign Office aims to develop a forecast-based funding mechanism and standard operating procedures that strengthen national preparedness and response capacities in case of a shock forecast. It will be implemented in Bangladesh, the Dominican Republic, Haiti, Nepal and the Philippines.<sup>25</sup> Projects and programmes that are multisectoral at the national level include, for example, the work undertaken by WaterAid, a member of the Alliance for Global Water Adaptation, which includes climate-resilient water, sanitation and hygiene approaches to ensure that critical water, sanitation and hygiene services are sustainable and resilient to the impacts of climate change. The work is currently being undertaken in multiple countries, from West Africa to South Asia, and at a regional level in Africa, the Americas, Asia-Pacific and Europe.<sup>26</sup> Another example refers to how the health sector is adapting: the Smart Health Facilities Initiative and Smart Hospitals Toolkit is being implemented in the Caribbean with the aim of supporting the governments of the selected countries to assess and prioritize vulnerability reduction investments in their health facilities.<sup>27</sup> The project is funded by the United Kingdom of Great Britain and Northern Ireland’s Department for International Development and implemented through the Pan American Health Organization in partnership with the ministry of health in each target country;

(d) **There are initiatives that are responsive to addressing vulnerable communities.** An example is the Rural Resilience Initiative developed by WFP and Oxfam America, with pilot programmes in Ethiopia, Malawi, Senegal and Zambia.<sup>28</sup> The Rural Resilience Initiative aims to add core resilience to the determinants of health, specifically food security and economic assets, by giving highly impoverished farmers innovative forms of access to crop insurance through labour-as-payment schemes;

(e) **There is also evidence of regional initiatives involved in preventing the health impacts of climate change.** For example, the HEAT-SHIELD project, funded by the European Commission, aims to improve heat resilience in the European workforce in

<sup>22</sup> <http://toplotnibranovi.mk/en/index.asp>; Kendrovski V and Spasenovska M (eds.). 2011. *The Effects on Health of Climate Change in the Republic of Macedonia*. Ministry of Health: Skopje. Available at [http://toplotnibranovi.mk/en/downloads/4\\_Publication\\_5\\_Vulnerability\\_assessment.pdf](http://toplotnibranovi.mk/en/downloads/4_Publication_5_Vulnerability_assessment.pdf); and Kendrovski V, Spasenovska M and Menne B. 2014. The public health impacts of climate change in the former Yugoslav Republic of Macedonia. *International Journal of Environmental Research and Public Health*. 11(6): pp.5975–5988. Available at <http://www.mdpi.com/1660-4601/11/6/5975/htm>.

<sup>23</sup> <http://www4.unfccc.int/nap/Documents/Supplements/WHO%20H-NAP%202014.pdf>.

<sup>24</sup> <http://www4.unfccc.int/nap/Documents/Supplements/WHO%20climate%20resilient%20health%20systems%202015.pdf>.

<sup>25</sup> <http://documents.wfp.org/stellent/groups/public/documents/communications/wfp288905.pdf>.

<sup>26</sup> <http://www.wateraid.org/uk/what-we-do/policy-practice-and-advocacy/research-and-publications/view-publication?id=ffdb9af5-8b49-44e8-8a64-33909cc546ae>.

<sup>27</sup> [http://www.paho.org/ecc/index.php?option=com\\_content&view=article&id=426&Itemid=332](http://www.paho.org/ecc/index.php?option=com_content&view=article&id=426&Itemid=332).

<sup>28</sup> <http://www.wfp.org/climate-change/initiatives/r4-rural-resilience-initiative>.

the context of climate change, and to provide know-how to the public and decision makers to undertake measures in the face of heat stress;<sup>29</sup>

(f) **There is some evidence that gender considerations and vulnerable communities, such as indigenous peoples, were taken into account.** An example of gender-sensitive analysis is the Fill the Nutrient Gap Tool of WFP, which analyses diets, taking into account the impacts of climate change, to find out whether the diets meet the nutritional requirements for vulnerable groups, including pregnant and lactating women. WFP is examining whether the tool can help to improve understanding of the barriers that climate change can pose to vulnerable people's access to adequate nutrition, especially those most vulnerable to malnutrition.<sup>30</sup> Some programmes include a component focused on indigenous peoples, such as the work of OraTaiao, the New Zealand Climate & Health Council, which aims to programmatically address, inter alia, the risks of climate change to the indigenous population of New Zealand.<sup>31</sup>

38. **There are also a number of training and awareness-raising activities aimed at health-care professionals, health planners, decision makers and the public to improve awareness and enhance understanding of climate change impacts on health and ways to develop resilient health systems.** For example, the training sessions organized by Deutsche Gesellschaft für Internationale Zusammenarbeit (developed by the United Nations Institute for Training and Research) in collaboration with WHO targeted representatives of the ministries of health and of environment of 53 Asian and African member States, to strengthen their ability to successfully engage in relevant UNFCCC discussions, while taking into account the impact of climate change on health and to raise awareness on climate change impacts on human health.<sup>32</sup> Another example is the Self-Learning Course on Climate Change and Health, developed by experts at Mexico's National Institute of Public Health in line with the joint Pan American Health Organization/WHO Strategy and Plan for Action on Climate Change, which is intended to raise awareness and improve knowledge on the health effects of climate change among the general public and other sectors, including health-care personnel, and was specifically developed and offered for the Latin American and Caribbean region.<sup>33</sup> An example of a public awareness campaign is the annual "Safe Summer Information/communication campaign" implemented by the Italian Ministry of Health, which intended to make the population aware of the health risks of extreme heat and how it was possible to prevent them.<sup>34</sup>

## 2. Opportunities and challenges

39. Parties and organizations mentioned a number of gaps, needs and challenges in terms of understanding the interlinkages between climate change and health (e.g. data, monitoring and knowledge) and the ability of countries and organizations to undertake health adaptation action (e.g. availability of and/or access to finance, capacity and awareness; and the integration of health into adaptation plans and development strategies). The key findings on this issue include those listed below (see paras. 40–46 below).

40. **There is a lack of and/or a lack of access to data and information on the life cycle, distribution and geographical spread of diseases as well as on other drivers (e.g.**

<sup>29</sup> <https://www.heat-shield.eu/> and [http://cordis.europa.eu/project/rcn/200678\\_en.html](http://cordis.europa.eu/project/rcn/200678_en.html).

<sup>30</sup> <http://documents.wfp.org/stellent/groups/public/documents/communications/wfp288102.pdf>.

<sup>31</sup> <http://www.orataiao.org.nz/>.

<sup>32</sup> <https://www.giz.de/de/en/html/index.html> and [https://unfccc.int/files/parties\\_observers/submissions\\_from\\_observers/application/pdf/675.pdf](https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/675.pdf).

<sup>33</sup> <https://mooc.campusvirtualsp.org/course/view.php?id=6> and

<https://www.campusvirtualsp.org/en/launch-self-learning-course-climate-change-and-health>.

<sup>34</sup> [http://www.salute.gov.it/portale/salute/p1\\_5.jsp?lingua=italiano&id=75&area=Vivi\\_sicuro](http://www.salute.gov.it/portale/salute/p1_5.jsp?lingua=italiano&id=75&area=Vivi_sicuro).

**deforestation and biodiversity loss) at multiple levels** (e.g. subnational and national), which makes it challenging to make attributions to climate and other stressors; to assess new and emerging health issues, including tropical diseases and impacts; and to make robust predictions for future scenarios. There is also a need for targeted field observation, community discussions, regional- and district-level analyses and disaggregated data. Gaps in knowledge were noted on the following topics in particular:

- (a) How do changes in ecosystems influence the epidemiology and distribution of infectious diseases?
- (b) How and where are diseases spreading and what exacerbates this change?
- (c) The current and projected climate information, so as to better predict changes in the geographical distribution of diseases;
- (d) The current and projected future impacts of climate change on malnutrition, waterborne diseases (and water quality in general), vector-borne diseases and disaster impacts;
- (e) How to estimate the costs of health-resilience measures?

41. **Downscaled climate models are needed in order to better predict the possible geographical spread of diseases.**

42. **There is inadequate integration of health into adaptation, development plans and other sector plans and policies (such as disaster risk reduction policies).** Innovative solutions that take into account intersectoral linkages such as the instauration of genetic diversity of seeds and crops could present opportunities to better adapt to those adverse conditions due to climate change.

43. **Adaptation plans, policies and actions addressing health also need to be gender-responsive so as to take into account the vulnerable communities that are disproportionately impacted by the impacts of climate change** (e.g. children, the elderly, pregnant women, migrants and others). For example, the link between gender and water issues needs to be addressed, so that vulnerable communities, and especially women, have a greater chance of being prepared if water-related climate hazards strike. In the light of a gap in occupational health and safety protection measures, there is a need for a human rights based approach to climate change and health adaptation policies. Such an approach would make the fulfilment of all human rights, including the human right to health, its primary objective, and would, inter alia, imply the inclusion of affected persons in decision-making processes, taking into account human rights obligations and principles.<sup>35</sup>

44. **Despite interest from countries in undertaking adaptation actions addressing health, the availability of, and access to, funding for health and adaptation is limited.** As a result, the implementation of health adaptation plans and projects, and of early-response systems, is limited. In collaboration with the World Medical Association, WHO analysed the status of health coverage in the nationally determined contributions. Most countries (especially lower-income countries) were found to highlight health as an issue, particularly in relation to adaptation. Despite this recognition of the importance of this topic, the findings suggested that an extremely small percentage (1.4 per cent) of climate change adaptation funds are allocated to health projects compared with investment in other sectors.<sup>36</sup>

<sup>35</sup> <http://www.ohchr.org/EN/Issues/HRAndClimateChange/Pages/RightHealth.aspx>.

<sup>36</sup> WHO. 2015. *Climate and Health Country Profiles: A Global Overview*. World Health Organization: Geneva.

45. The issue of health and climate change is complex, with many interlinked aspects, hence it spans multiple sectors. However, **intersectoral and interministerial engagement is often a challenge in developing an integrated programme of actions on health**. There is a lack of programmes and projects of an integrated nature that combine actions aimed at climate change, health and other sectors like water; and there is a need to consider innovative intersectoral solutions. Opportunities exist at both the national and the global level as follows:

(a) At the national level, for example, adaptation action focusing on health can benefit from intersectoral cooperation between ministries of health and ministries of the environment, water and climate change, as well as ministries that engage in related work, for example ministries of planning and infrastructural development;

(b) At the global level, there is a need for the NWP, in its role as a global institutional mechanism, to facilitate the flow of information between global health experts and relevant UNFCCC mechanisms (e.g. the constituted bodies).

46. **There is a lack of capacity among health-care professionals and adaptation practitioners as well as a lack of public awareness in understanding and addressing the impacts of climate change on health**. For example, capacity gaps in the health sector include laboratory diagnostic capacities; capacities to use available climate information with health relevance; capacities to cost health adaptation efforts; and capacities to develop strategies and plans to protect health from the risks of climate change. Many health-care professionals lack the capacity to understand and assess the impacts of climate change on health and health infrastructure, often as a result of inadequate tools/expertise related to the use of climate information and climate services in the health sector. There is also a need for more guidance to be provided to the public on how to act in the event of climate change impacts such as heatwaves and storms.

#### **IV. Further climate action on health and adaptation: dialogue among Parties, partner organizations and experts**

47. During the 10<sup>th</sup> Focal Point Forum, Parties, partner organizations and experts discussed and identified a range of actions to be undertaken by different actors in order to advance work on health and adaptation. This chapter highlights the key ideas and proposals that have emerged from discussions during the forum and inputs received after the forum, which could be considered as a basis for possible next steps, including in the context of the NWP.

48. As noted in the document overview, the **proposed actions** are grouped under the following clusters:

(a) Enhancing research and health information systems;

(b) Adopting a comprehensive approach to integrating health into climate change adaptation plans, projects and programmes and to combining climate change with other determinants and drivers of health-care systems;

(c) Developing the capacity of the health-care workforce and educational institutions in order to develop climate-resilient health-care systems;

(d) Strengthening intersectoral action and multilevel governance;

(e) Promoting climate-resilient and sustainable health infrastructure and technologies;

(f) Scaling up financial investments/flows towards adaptation plans and actions addressing health.

49. With regard to **enhancing research and health information systems**, the following key actions have been suggested:

(a) Using the results of global climate projections of health impacts to generate evidence at the national level and communicating evidence of climate change effects on human health to health communities and populations, and relevant UNFCCC processes (e.g. national communications) in collaboration with the NWP, WHO and the World Meteorological Organization (WMO);

(b) In order to address the effects of climate change on health and productivity in the workplace:

(i) Establishing early warning systems and building cooling shelters and green zones to protect people from heatwaves in cities, in collaboration with WHO, WMO and national meteorological departments/services;

(ii) Developing an application programme/tool that allows health-care workers to access scientific data on health impacts/imminent health threats related to climate change in collaboration with software developers, scientists and governments;

(c) In order to address the issues of malnutrition, waterborne diseases, vector-borne diseases and disaster impacts, developing a multidisciplinary approach for establishing solutions both for early warning systems and adequate response measures to respond to malaria outbreaks. For example, this could involve creating early warning systems to alert the health sector about changes in weather patterns for communities located in regions that have never experienced malaria outbreaks and for other communities that are ill-equipped to respond to unprecedented outbreaks. This would result in doctors being prepared in advance for the organized distribution of nets to protect people from increased mosquito numbers;

(d) Undertaking 'new' research to understand the trends, geographical distribution and evolution of new and emerging health issues, including tropical diseases (such as the Zika virus) and their impacts on social and economic structures in relation to current climatic conditions and future climate predictions, and disseminating the outcomes among national and subnational governments and health practitioners.

50. With regard to **adopting a comprehensive approach to integrating health into climate change adaptation plans, projects and programmes and to combining climate change with other determinants and drivers of health-care systems**, the following ideas have emerged:

(a) To adopt a comprehensive approach to integrating health systems into national adaptation plans and policies, including NAPs, and national disaster risk reduction frameworks and policies;

(b) To curate knowledge and facilitate the exchange of evidence-based knowledge and information, including both lessons learned and good practices on health and adaptation among science, policy and practice communities at all levels (e.g. establishing a collaborative thematic group on health) through a global platform such as the NWP, in collaboration with national governments, WHO and other relevant partners, in order:

(i) To address the challenge of compartmentalized knowledge and institutional fragmentation;

(ii) To share evidence-based knowledge effectively;

- (iii) To produce problem-based solutions with health champions;
- (iv) To link ongoing actions and national priorities on health and adaptation with relevant UNFCCC processes (e.g. the work of the constituted bodies such as the Adaptation Committee, the LEG, the CGE, the Executive Committee of the Warsaw International Mechanism; and the technical examination process on adaptation);
- (c) To develop local/regional case studies of actions that are long term and focus on a series of interconnected strategies that can impact many different issues, including health;
- (d) To use the mass media and social media (e.g. Facebook and Twitter) to communicate information on climate change impacts on human health and on lessons learned and good practices in health and adaptation;
- (e) To undertake an analysis of national policies and adaptation strategies in order to assess health gains for countries and to monitor the contribution of countries' policies and actions to the Sustainable Development Goals on climate change and health.

51. Under **developing the capacity of the health-care workforce and educational institutions in order to develop climate-resilient health-care systems**, the following key messages have emerged:

- (a) Train health professionals on how to deal with climate implications, including emerging health risks and diseases, when providing health care for their patients (e.g. training for health professionals, inclusion of this topic in the curricula of medical schools and training for academics involved in teaching in medical schools);
- (b) Design an international/global course on health and climate and include this as a part of university curricula in all countries, in collaboration with governments, WHO and universities;
- (c) Enhance the awareness of the public, in particular people more vulnerable to the impacts of climate change, so that they are better informed on how to cope with exposure to heatwaves in collaboration with medical schools/universities. This includes those working in industries that are particularly vulnerable, including farmers, construction workers and those working in tourism and transportation;
- (d) Train national experts from environment ministries to conduct health assessments in order to understand the linkages between climate change adaptation and health impacts.

52. With regard to **strengthening intersectoral action and multilevel governance**, the following ideas have emerged:

- (a) Develop integrated and systematic programmes that take intersectoral linkages – those between the availability of and access to water resources, the distribution of vectors, pests and pathogens and ecosystem services – into account and engage with health communities, governments, cities, United Nations agencies and civil society in order to develop a holistic approach to such programmes and actions;
- (b) Work with a combination of traditional and indigenous knowledge practices and modern techniques, to establish problem-based solutions focused on reducing water scarcity.

53. In relation to **promoting climate-resilient and sustainable health infrastructure and technologies**, the following key actions have been proposed:

- (a) Scaling up financial investments in adaptation technology in the health sector and in health adaptation to climate impacts;

(b) Designing a climate robust health system so that utility investments (e.g. water, energy and sanitation) will endure in the face of either extreme events or in terms of the long-term evolution of regional climate, noting that robust designs have largely proven to be costlier only by increments.

54. With regard to **scaling up financial investments/flows towards adaptation plans and actions addressing health**, the following actions have emerged, in particular addressing the issue of malnutrition, waterborne diseases, vector-borne diseases and disaster impacts:

(a) Collecting information and identifying innovative financing and best practices; facilitating dialogue among science, policy and practice communities, which helps governments to build their knowledge of financial instruments and financing; and helping to design and implement pilot activities regarding climate change and health;

(b) Developing partnerships to mobilize more investment so as to meet additional costs created as a result of climate change (e.g. facilitating dialogue among climate finance institutions and health experts to discuss available financing and innovative means);

(c) Disbursing resources urgently and adequately in order to facilitate the implementation of actions in relevant countries and, in particular, to develop climate-resilient health systems.

## V. Conclusions

55. SBSTA 46 will be invited to consider this synthesis paper and to decide on any possible next steps. The SBSTA may also wish to consider the actions proposed in chapter IV above for any recommendations, including in the elaboration of further activities under the NWP.

## Annex I

### **Background on the Nairobi work programme: knowledge to action network on adaptation**

[English only]

1. The Nairobi work programme on impacts, vulnerability and adaptation to climate change (NWP) **contributes to advancing adaptation action through knowledge in order to scale up adaptation at all governance levels, with a focus on developing countries**. It synthesizes and disseminates information and knowledge on adaptation, facilitates science–policy–practice collaboration in closing adaptation knowledge gaps and fosters learning to boost adaptation actions, including through the adaptation knowledge portal. Activities under the NWP involve close collaboration with a network of over 340 organizations working on adaptation all over the world. The NWP provides support on adaptation knowledge and stakeholder engagement to Parties, as well as to the Adaptation Committee and the Least Developed Countries Expert Group, which is in line with new processes under the Paris Agreement.
2. In accordance with the role of the NWP **as a knowledge hub that supports enhanced action on adaptation**, the 10th Focal Point Forum provided an opportunity for policymakers, researchers, practitioners and representatives of financial institutions not just to exchange information on the actions that they are engaged in, but also to identify strategic areas of collaboration in order to close critical knowledge gaps in the area of climate impacts on health.
3. When Parties consider the outcomes of NWP activities on human health and adaptation at the forty-sixth session of the Subsidiary Body for Scientific and Technological Advice, there could be further opportunities under the NWP for fostering science–policy–practice collaboration in order to reduce climate risks on health and to enhance the overall resilience of health systems.

## Annex II

### Overview of submissions on health and climate change

[English only]

<i>Party/organization</i>	<i>Changes in the geographical distribution of diseases</i>	<i>New and emerging diseases, including tropical diseases and their impacts on social and economic structures</i>	<i>Issues of malnutrition, waterborne diseases, vector-borne diseases and disaster impacts</i>	<i>Effects of climate change on health and productivity in the workplace, with implications for occupational health, safety and social protection</i>
<i>Parties</i>				
Congo		✓	✓	✓
Democratic Republic of the Congo	✓		✓	
Ethiopia		✓		
European Union	✓	✓	✓	✓
Ghana	✓			
Guatemala	✓	✓	✓	✓
Indonesia		✓	✓	✓
Mexico	✓	✓		
Pakistan		✓	✓	
Philippines		✓	✓	
Russian Federation		✓	✓	
Serbia	✓	✓	✓	
South Africa	✓		✓	✓
The former Yugoslav Republic of Macedonia	✓	✓	✓	
Zimbabwe	✓	✓	✓	
<i>Organizations</i>				
Center for Health and the Global Environment	✓	✓	✓	
Gesellschaft für Internationale Zusammenarbeit		✓	✓	
HEAT-SHIELD project				✓
Health and Environment International Trust				✓
Institut de Recherche pour le Développement	✓	✓	✓	
Nepal Health Research Council	✓	✓	✓	
New Zealand Climate & Health Council (OraTaiao)		✓	✓	✓
Office of the United Nations High Commissioner for Human Rights	✓		✓	✓
Statens Serum Institut (National Danish Institute for Infectious Diseases)	✓	✓	✓	

<i>Party/organization</i>	<i>Changes in the geographical distribution of diseases</i>	<i>New and emerging diseases, including tropical diseases and their impacts on social and economic structures</i>	<i>Issues of malnutrition, waterborne diseases, vector-borne diseases and disaster impacts</i>	<i>Effects of climate change on health and productivity in the workplace, with implications for occupational health, safety and social protection</i>
World Food Programme			✓	
World Health Organization	✓		✓	✓
World Meteorological Organization	✓		✓	✓

## Annex III

### Proceedings of the 10<sup>th</sup> Focal Point Forum on health and adaptation

[English only]

1. The 10<sup>th</sup> Focal Point Forum of the Nairobi work programme on impacts, vulnerability and adaptation to climate change (NWP) **focused on the topic of health and adaptation** and was held under the overall guidance of the Chair of the Subsidiary Body for Scientific and Technological Advice (SBSTA), Mr. Carlos Fuller, on 9 November 2016 in conjunction with SBSTA 45.<sup>1</sup> The forum provided the opportunity for delegates from Parties, NWP focal points and relevant health experts to discuss the results of the submissions and emerging issues on health and adaptation. Particular focus was placed on identifying actions to respond to identified gaps and needs in order to scale up adaptation actions addressing health.

2. **The Chair of the SBSTA** provided the overall context for and objective of the forum. He underscored that the forum provided an excellent opportunity for policymakers, researchers, scientific communities, practitioners and financial institutions not just to exchange information on actions that they are engaged in, but also to identify areas of strategic collaboration in order to close critical gaps that will help to inform adaptation actions addressing the topic of health.

3. In his keynote presentation, **the representative of the World Health Organization (WHO)** provided an overview of the interlinkages between climate change and health, and elucidated a global landscape of climate change impacts on human health and of adaptation actions for health impacts, including actions undertaken by WHO. A representative of the secretariat provided an overview of the submissions received on health and adaptation. Emphasizing the insufficient understanding of climate change impacts on health, the representative of the United Nations Environment Programme highlighted the Lima Adaptation Knowledge Initiative, which aims to identify key adaptation knowledge gaps and facilitate action to address them, and provided an update on the outcomes of the workshops for Hindu Kush-Himalayan and Indian Ocean island countries with specific reference to health-related knowledge gaps.<sup>2</sup>

4. The representative of the Red Cross/Red Crescent Climate Centre facilitated an interactive dialogue among the participants in small working groups. During the discussion, participants **identified health problems related to climate change and engaged in finding/designing innovative actions to address them**, including the responsible/possible agents to perform those actions.

5. The Chair of the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention and a member of the Least Developed Countries Expert Group also provided remarks on relevant activities in the context of their respective constituted bodies before the Chair of the SBSTA closed the forum.

6. SBSTA 45 acknowledged the receipt of submissions from Parties, NWP partner organizations and other relevant organizations on their recent work in the area of climate

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<sup>1</sup> Further details on the 10<sup>th</sup> Focal Point Forum are available at <http://unfccc.int/9926>.

<sup>2</sup> Further details on the outcomes of the Lima Adaptation Knowledge Initiative workshops are available at <http://www4.unfccc.int/sites/NWP/Pages/LAKI-Asia.aspx>.

impacts on human health and noted that they provided a useful basis for the organization of the 10<sup>th</sup> Focal Point Forum. In addition, it welcomed the rich and constructive dialogue that took place among Parties, NWP partner organizations, other relevant organizations and health experts during the forum on climate change impacts on human health. Finally, SBSTA 45 noted with appreciation the extensive work that is being undertaken by Parties and organizations in response to the current and future impacts of climate change on health, and welcomed the dialogue on innovative actions to address such impacts.<sup>3</sup>

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<sup>3</sup> FCCC/SBSTA/2016/4, paragraphs 12 and 13.

## Annex IV

### Tools and methods for vulnerability and impact assessment, planning and implementation, and monitoring and evaluation, addressing health referred to in submissions

[English only]

<i>Title</i>	<i>Contributing Party/organization</i>	<i>Description of the tool/method</i>	<i>VIA</i>	<i>P&amp;I</i>	<i>M&amp;E</i>
Epidemiologic modelling tool	Philippines	<ul style="list-style-type: none"> <li>• Determines relationships between climate factors and diseases</li> <li>• Prepares communities to mitigate the effects of increases in infectious diseases</li> <li>• Extrapolates the relationship between climate and a disease in time (e.g. monthly temperature and incidence of diarrhoea in a population by year) to estimate change in temperature-related diseases under future climate change</li> <li>• Creates a predictive model intended to assess the change in the number of cases of infectious diseases under future climate change conditions</li> </ul>	✓		✓
The Disability Adjusted Life Years (DALY) approach	Philippines	<ul style="list-style-type: none"> <li>• Facilitates environmental health impact assessment and cost-effectiveness analysis. The DALY is the addition of the amount of time in years lost due to premature death from a specific disease and the period of time someone has to live suffering from a disability brought about by a specific disease</li> <li>• Based on historical data in Bangladesh, a major storm event may result in approximately 290 DALY per 1000 population, including both deaths and injuries, compared with a current all-cause rate of about 280 per 1000 in the region</li> </ul>	✓	✓	✓
The Breteau Index	Philippines	<ul style="list-style-type: none"> <li>• Measures the number of containers positive for mosquito larvae per 100 houses inspected, combines an analysis of dwellings and containers and is more qualitative. The index has been linked with the transmission level of dengue fever and can be used as a warning indicator of the disease</li> </ul>	✓		✓

<i>Title</i>	<i>Contributing Party/organization</i>	<i>Description of the tool/method</i>	<i>VIA</i>	<i>P&amp;I</i>	<i>M&amp;E</i>
Vulnerability map	Ethiopia, Democratic Republic of the Congo, Slovakia and the former Yugoslav Republic of Macedonia	<ul style="list-style-type: none"> <li>• Offers a visual representation of vulnerable areas or ‘hotspots’</li> <li>• Provides local national planners with a visual reference of areas that are more vulnerable to environmental changes brought about by climate change</li> </ul>	✓	✓	✓
Climate Change Health Impact Modelling Tool	Philippines	<ul style="list-style-type: none"> <li>• Assesses whether health and climate change data are appropriate for impact modelling</li> <li>• Develops climate change impact models to be used by local health officers, municipal development planners, National Economic and Development Authority and Department of Health planners in projecting the impact of climate change</li> <li>• Recommends data gathering improvement measures that will be useful for future impact modelling</li> </ul>		✓	
A gender-sensitive climate-resilient screening tool	Ghana	<ul style="list-style-type: none"> <li>• Measures the resilience of health infrastructures to enable policy formulation, guidelines and responses from decision makers in the health sector in Ghana</li> <li>• Encourages the involvement of men and women in all programmes and activities in an attempt to bridge the gender gap</li> </ul>	✓	✓	✓
A telemedicine system	Ghana	<p>Telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve, maintain or assist patients’ health status. Benefits of telemedicine include:</p> <ul style="list-style-type: none"> <li>• A fundamental shift in the way information is accessed and shared at the health centres, by offering a new approach to patient management and expanding the use of the existing knowledge base to manage health challenges across geographical boundaries</li> <li>• More efficient and effective health services in the face of ever-growing resource constraints. Health managers and providers in pilot districts gain better control of resources and this ensures</li> </ul>	✓	✓	✓

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		optimal health outcomes in the pilot districts			
The provision of mobile phone handsets	Ghana	The provision of mobile phone handsets to junior nurses and other health workers increases interaction flow between medical staff at different levels and reduces unnecessary referral cases and mortality		✓	
The introduction of global satellite positioning	Ghana	Facilitates the easy location of patients and increases access to health services	✓	✓	✓
HEAT-SHIELD tool	Health and Environment International Trust	<ul style="list-style-type: none"> <li>• Includes methods to quantify workplace heat stress and demonstrates impacts</li> <li>• Provides heat warning systems for workplaces</li> <li>• Includes links to routine weather forecasting and longer-term climate projections</li> <li>• Identifies specific heat protection methods</li> </ul>	✓	✓	✓
Occupational health and productivity analysis methods, and output tests	Health and Environment International Trust	<ul style="list-style-type: none"> <li>• Consists in analysis methods for heat exposure and heat stress</li> <li>• Contributes to assessing whether existing heat stress indices, such as the Wet Bulb Globe Temperature, need improvement to better represent the health and productivity effect risks</li> <li>• Facilitates the calculation of quantitative labour output loss, due to heat-related productivity loss, for each grid cell and for a combination of grid cells representing countries or regions</li> </ul>	✓		✓
Quantification of Representative Concentration Pathways (RCPs) at country level	Health and Environment International Trust	Builds on grid-cell based data to calculate the impacts of different RCPs (RCP8.5, RCP6, RCP4.5 and RCP2.6) and the range of impacts for different models for any country	✓		✓
Heat exposure thresholds for habitability tool	Health and Environment International Trust	Analyses the issue of habitability, including how many people may be affected when their home area becomes so hot that it is either impossible or very unhealthy to keep living in the area	✓		
Hothaps-Soft	Health and Environment International Trust	<ul style="list-style-type: none"> <li>• Provides weather station data from as early as 1980, and heat analysis, via user-friendly software</li> <li>• Facilitates local studies of ongoing climate change and impacts</li> </ul>	✓		✓

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		for local scientists			
ClimateCHIP.org	Health and Environment International Trust	<ul style="list-style-type: none"> <li>• Provides grid-cell based heat and impacts data via a user friendly website</li> <li>• Uses climate data from the Inter-Sectoral Impact Model Intercomparison Project (Potsdam Institute) and calculates Wet Bulb Globe Temperature and the Universal Thermal Climate Index so that they can be displayed for any of the 67,000 grid cells over land. Its purpose is to help local government agencies, enterprises, communities, scientists, school teachers and interested individuals to find out about ongoing climate change since 1980 and the projected heat exposure situations until the end of the century</li> </ul>	✓		✓
World Health Organization vulnerability and adaptation assessment guidelines for the health sector	University of Washington Center for Health and the Global Environment	Provides information on conducting vulnerability and adaptation assessments in the health sector, in order to prepare the health component of a national adaptation plan	✓	✓	✓
Dynamic Mosquito Simulation Model	University of Washington Center for Health and the Global Environment	Consists in a coupled entomological/epidemiological model that simulates mosquito population dynamics, pathogen incubation and transmission dynamics, as well as human infection status, using meteorological data as a driver	✓		
The Consolidated Livelihood Exercise for Analysing Resilience methodology	World Food Programme	Consists in an analytical approach to better understand how food security is affected by climate risks	✓		
The Integrated Context Analysis tool	World Food Programme	Enables historical trend analyses of existing data on food insecurity, natural shocks and land degradation. Identifying areas of overlap across these dimensions helps to inform discussions among a variety of stakeholders on the most appropriate programmatic strategies in specific geographical areas, with additional, more detailed thematic analyses incorporated as needed	✓	✓	
Food insecurity and climate	World Food Programme	Analyses current and projected levels of countries' vulnerability	✓		✓

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change vulnerability index	Programme	to food insecurity			
The Shock Impact Simulation Model	World Food Programme	Analyses the outcomes of shocks (economic, market and production) on food security, so as to help estimate people's needs for food assistance across population, livelihood groups and areas in selected low-income and food-deficit countries	✓	✓	

*Abbreviations:* VIA = vulnerability and impact assessment, P&I = planning and implementation, M&E = monitoring and evaluation.