

# WHO guidance to protect health from climate change through health adaptation planning



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# Contents

List of acronyms and abbreviations . . . . .	iv
I. Overview of the National Adaptation Plan (NAP) process and purpose of the guidance . . . . .	v
II. Health within the NAP process: the HNAP . . . . .	vi
III. Principles of the national health adaptation process . . . . .	1
IV. Key concepts in health adaptation to climate change . . . . .	2
V. The health adaptation process: elements and steps . . . . .	4
A) Lay the groundwork and address gaps in undertaking the HNAP process. . . . .	4
Step 1. Align the health adaptation planning process with the national process for developing a National Adaptation Plan . . . . .	4
Step 2. Taking stock of available information. . . . .	8
Step 3. Identify approaches to address capacity gaps and weaknesses in undertaking the HNAP .	9
B) HNAP preparatory elements . . . . .	9
Step 4. Conduct a health V&A assessment, including short- to long-term adaptation needs in the context of development priorities . . . . .	9
Step 5. Review implications of climate change on health-related development goals, legislation, strategies, policies and plans . . . . .	12
Step 6. Develop a national health adaptation strategy that identifies priority adaptation options.	13
C) Implementation strategies . . . . .	16
Step 7. Develop an implementation strategy for operationalizing HNAPs and integrating climate change adaptation into health-related planning processes at all levels, including enhancing the capacity for conducting future HNAPs . . . . .	16
Step 8. Promote coordination and synergy with the NAP process, particularly with sectors that can affect health, and with multilateral environmental agreements . . . . .	18
D) Reporting, monitoring and review . . . . .	19
Step 9. Monitor and review the HNAP to assess progress, effectiveness and gaps . . . . .	19
Step 10. Update the health component of the National Adaptation Plans in an iterative manner. .	23
Step 11. Outreach on the HNAP process, including reporting on progress and effectiveness . .	23

# List of acronyms and abbreviations

<b>CCC</b>	Country Coordination Committees
<b>COP</b>	Conference of the Parties
<b>GCF</b>	Green Climate Fund
<b>GFCS</b>	Global Framework for Climate Services
<b>HNAP</b>	health national adaptation process
<b>LEG</b>	Least-developed Countries Expert Group
<b>LDC</b>	least-developed countries
<b>LDCF</b>	Least-developed Countries Fund
<b>M&amp;E</b>	monitoring and evaluation
<b>NAP</b>	National Adaptation Plan
<b>NAPA</b>	National Adaptation Programme of Action
<b>UNDP</b>	United Nations Development Programme
<b>UNEP</b>	United Nations Environment Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>V&amp;A</b>	vulnerability and adaptation
<b>VBD</b>	vector-borne diseases
<b>WHO</b>	World Health Organization

# I. Overview of the National Adaptation Plan (NAP) process and purpose of the guidance

Sustainable development became a formal global process in 1992, when the three Rio Conventions (i.e. on biodiversity, climate change and desertification) were adopted at the Earth Summit. The 1992 United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, adopted in 1997, refer to the legal frameworks that maintain the international climate change process and agenda. Both legal instruments are serviced by the Climate Change Secretariat or UNFCCC secretariat.<sup>1</sup> The Secretariat is accountable to the Conference of the Parties (COP) to the Convention, which meets annually to negotiate and further discuss the international climate change agenda and related commitments from countries. Articles 7<sup>2</sup> and 9<sup>3</sup> of the UNFCCC set the framework for international organizations to cooperate and contribute technically in their respective areas of work to the COP and to its subsidiary body for scientific and technological advice.

The World Health Organization (WHO) is contributing its technical and programmatic experience to the UNFCCC process. WHO has been working on climate change and health for over 20 years, building on its long experience in supporting countries to build resilience of their health systems, to facilitate modifications of current systems to reduce the health risks posed by climate variability and change.

Created under the global UNFCCC climate change agenda, the National Adaptation Plan (NAP) process builds on the National Adaptation Programmes of Action (NAPA) process that was designed to support least-developed countries (LDCs) to identify priority actions to respond to their urgent and immediate adaptation needs. The NAP process is intended to provide support for medium- and long-term adaptation planning needs in LDCs and other developing countries.<sup>4</sup>

Having the UNFCCC in general, and the NAP process in particular, as a framework, the present guidance aims to ensure that the health sector works with partners in the environment and other related communities, and follows a systematic process to:

1. Engage in the overall NAP process at the national level.
2. Identify national strategic goals for building health resilience to climate change (if countries have not done so through, for example, a National Health Adaptation Strategy).
3. Develop a national plan with prioritized activities to achieve these goals, within a specific time period and given available resources.

The guidance outlines the process to be followed to ensure these goals are achieved. In addition, further guidance on how to plan for building climate resilient health systems at country level is provided.

<sup>1</sup> UNFCCC. The Secretariat ([http://unfccc.int/secretariat/history\\_of\\_the\\_secretariat/items/1218.php](http://unfccc.int/secretariat/history_of_the_secretariat/items/1218.php)).

<sup>2</sup> Article 7 of the UNFCCC: “*The Conference of the Parties shall: (l) Seek and utilize, where appropriate, the services and cooperation of, and information provided by, competent international organizations and intergovernmental and non-governmental bodies.*”

<sup>3</sup> Article 9 of the UNFCCC: “... 2. *Under the guidance of the Conference of the Parties, and drawing upon existing competent international bodies, the Subsidiary Body for Scientific and Technological Advice shall: ...*”

<sup>4</sup> *The National Adaptation Plan process. A brief overview.* Geneva, UNFCCC/Least-developed Countries Expert Group (LEG), 2012 ([http://unfccc.int/files/adaptation/application/pdf/19688\\_unfccc\\_nap\\_summary\\_low\\_v8.pdf](http://unfccc.int/files/adaptation/application/pdf/19688_unfccc_nap_summary_low_v8.pdf)).

## II. Health within the NAP process: the HNAP

This guidance document is designed to ensure that the process of iteratively managing the health risks of climate change is integrated into the overall NAP process, including through assessing risks; identifying, prioritizing, and implementing adaptation options; and monitoring and evaluating the adaptation process. Supported by the LEG, the UNFCCC and other relevant partners (e.g. United Nations Development Programme (UNDP), United Nations Environment programme (UNEP), WHO, development agencies and nongovernmental organizations), countries can use the NAP process to start planning their mid- and long-term priorities to build resilience to climate change across all relevant sectors.

In 2010, WHO assessed the inclusion of health within NAPAs (conducted by least-developed countries and small island states). The assessment concluded that 39 out of 41 (95%) NAPAs identified health as a priority sector negatively impacted by climate change. 30/41 (73%) of the NAPAs identified health interventions within their list of adaptation needs and proposed actions. While 11% (50 out of 459) of the priority projects focused on health,<sup>5</sup> only approximately 4% of the portfolio of the Least-developed Countries Fund (LDCF) funds supporting the NAPA process targeted health adaptation.<sup>6</sup> Potential explanations for this lack of support for health sector adaptation include that the health community was largely absent from the NAPA process; the health sector did not submit proposals to the LDCF; and the limited technical guidance that was made available to ensure the proposals on health adaptation that were developed fulfilled minimum technical requirements.

To achieve the goals of healthy people in healthy communities, it is critical that the health sector is properly represented in the NAP process. Not including the health sector in adaptation planning can miss critical actions to protect population health, and can result in policies and programmes in other sectors inadvertently causing or contributing to adverse health impacts, thereby also undermining efforts to protect the environment. Furthering participation of the health sector will facilitate access by the health sector to national adaptation funds made available through the LDCE, adaptation fund (AF), green climate fund (GCF), and other funds. Coordination will also ensure that the health sector maximizes synergies and promotes health co-benefits across health determining sectors, such as energy, agriculture, housing and water.

The health national adaptation process (HNAP) should be the **health component of the National Adaptation Plan (NAP)**,<sup>7</sup> including as an output a detailed **health adaptation plan** designed to achieve the national health adaptation goals within a specific period of time and given available resources.

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<sup>5</sup> Overview of health considerations within National Adaptation Programmes of Action for climate change in least-developed countries and small island states. Geneva, World Health Organization, 2012

<sup>6</sup> The Global Environment Facility (GEF): Least Developed Countries Fund. Financing the preparation and implementation of NAPAs in response to urgent and immediate adaptation needs (<http://www.thegef.org/gef/LDCF>).

<sup>7</sup> *NAP technical guidelines* ([http://unfccc.int/cooperation\\_support/least\\_developed\\_countries\\_portal/items/7279.php](http://unfccc.int/cooperation_support/least_developed_countries_portal/items/7279.php)).



# III. Principles of the national health adaptation process

The HNAP process follows the principles stated in the LEG guidance for the overall NAP process. These include:

- The NAP is a country-driven process owned by the countries.
- Ensuring that health adaptation planning is based on the best available evidence. Any adaptation plan should aim at strengthening the development and availability of evidence, building the data and reducing knowledge gaps, and inform relevant policies.
- Building on existing national efforts towards health adaptation to climate change, including assessments, and development and implementation of policies and programmes at local to national levels.
- Integrating health adaptation to climate change into national health planning strategies, processes, and monitoring systems.
- Providing for a flexible and context-specific approach to health adaptation to climate change. National circumstances and available information and experience on health and climate change will determine the scope, institutional arrangements, and resources required to properly implement the health component of the NAP.
- Maximizing synergies across sectors, mainly across those that determine health, such as the food, water, energy and housing sectors. This calls for developing relevant health indicators within the adaptation monitoring systems in these sectors, ensuring that health considerations are integrated into their adaptation planning to avoid maladaptation.
- Ensuring that the health adaptation plan feeds into and coordinates with the overall NAP.
- Piloting approaches that promote an iterative process for health adaptation to climate change, producing time-bound plans.
- Promoting inter-country collaboration and harmonizing adaptation approaches at sub-regional levels.

## IV. Key concepts in health adaptation to climate change

Public health has long history in designing, implementing, monitoring and evaluating strategies, policies and programmes to manage the risks of climate-relevant health outcomes. This process, when applied to climate change, is termed adaptation by the climate community. The degree to which programmes will need to be augmented will depend on factors such as:<sup>8</sup>

- The current burden of climate-sensitive health outcomes. The focus of vulnerability and adaptation (V&A) assessments is often on outcomes that cause the largest health burdens now. Adaptation will help populations prepare for changes that could increase the incidence, seasonality or geographic range of climate-relevant health outcomes or that make their control more difficult.
- The effectiveness of current interventions to manage the health risks of climate variability and change. Few current programmes and measures are as effective as desired. Understanding the extent to which current public health and health care policies and programmes are effective, and the reasons for limits to effectiveness, is a first step in understanding what modifications are needed to address the risks of a changing climate.
- Projections of where, when and how health burdens could be modified in response to changes in the mean and variability of climate.

All interventions need to take into account the social, economic and political context within which they will be implemented. Differences between communities and nations will affect the exact structure of interventions and the process by which they will be implemented.

There are many ways to categorize adaptation options. One approach is to divide them into incremental, transitional and transformational adaptations. The main goal of incremental adaptation is to modify current programmes to improve public health and health care functions. While these actions are critically important, they may not be sufficient to protect population health as the climate continues to change. Transitional adaptation occurs with changes in underlying assumptions; this includes vulnerability mapping, early warning systems and other measures when they explicitly incorporate climate change. Transformation occurs when adaptation programmes change the fundamental approaches to managing the health risks of climate change. While there is considerable interest in transformational adaptation, examples do not yet exist.

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<sup>8</sup> Ebi KL, Kovats RS, Menne B. An approach for assessing human health vulnerability and public health interventions to adapt to climate change. *Environmental Health Perspectives*, 2006;114:1930-1934.

Other important concepts are adaptive capacity and resilience. Adaptive capacity is the *combination of the strengths, attributes and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities.*<sup>9</sup> Adaptive capacity describes the potential to take proactive action to prepare for the health risks of climate change. Resilience is the *ability of a system and its component parts to anticipate, absorb, accommodate or recover from the effects of a hazardous event in a timely and efficient manner.*<sup>9</sup>

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<sup>9</sup> IPCC 2012: *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

# V. The health adaptation process: elements and steps

It is important for the health adaptation process to be consistent with and easily link to the NAP process. The technical guidelines developed by the LDC Expert Group<sup>10</sup> were prepared to support least-developed and developing countries in planning their national adaptation policies and programmes. The guidelines include four elements, each with several steps. Other low- and middle-income countries are using the guidelines in their national adaptation processes.

The elements of the process are: lay the groundwork; preparatory elements; implementation strategies; and report, monitor, and review. These are broadly related to the phases of a project cycle (identification, formulation, implementation, and monitoring and evaluation). Brief guidance for each element and steps is provided, along with links to additional materials that expand on the methods and tools available to achieve each step.

## A) Lay the groundwork and address gaps in undertaking the HNAP process

### *Step 1. Align the health adaptation planning process with the national process for developing a National Adaptation Plan*

This first step is critical to ensuring coordination with the overall national process for adaptation to climate change and to promoting sustainability of health adaptation efforts. It is important to ensure a strong connection with the overall national process. Because it is expected that most LDCs will have access to adaptation funds through the NAP process, having health represented in the overall arrangements will facilitate access to those funds by the health sector.

The health sector has started to assess and plan its adaptation strategies in many countries, with institutional arrangements in place to some extent in most countries.<sup>11,12,13</sup> Regional and national processes and plans of actions (e.g. regional strategies on climate change and relevant plans of action) often have to be strengthened to facilitate the sound implementation and sustainability of the health adaptation process. It is the responsibility of the health sector to effectively organize and communicate its own institutional arrangements and implement adaptation to climate change at the national level. An example in the African context is the institutional arrangements to coordinate the overall NAP process (see text box).

<sup>10</sup> NAP technical guidelines ([http://unfccc.int/cooperation\\_support/least\\_developed\\_countries\\_portal/items/7279.php](http://unfccc.int/cooperation_support/least_developed_countries_portal/items/7279.php)).

<sup>11</sup> WHO progress report on Climate Change and Health to the 132th Executive Board, January 2013 (EB132/42 Add.1 [http://apps.who.int/gb/e/e\\_eb132.html](http://apps.who.int/gb/e/e_eb132.html)).

<sup>12</sup> *Building momentum for implementation of the Libreville Declaration on Health and Environment in Africa*. Geneva, World Health Organization, 2012.

<sup>13</sup> *Fifth Ministerial Conference on Environment and Health*. EUR/55934/5.1 Rev. 2. Copenhagen, World Health Organization, 2010. (<http://www.euro.who.int/en/what-we-do/event/fifth-ministerial-conference-on-environment-and-health/documentation/parma-declaration-on-environment-and-health>).

## Box 1: Public Health Adaptation to Climate Change in Africa: a joint commitment from Ministries of Health and Environment

WHO and UNEP, in partnership with the Government of Gabon, organized an inter-ministerial conference for health and environment in Africa in 2008, to secure a political commitment for catalysing the policy, institutional and investment changes required to reduce environmental threats to health, in support of sustainable development. The conference aimed to: (1) demonstrate the importance of recognizing the interlinkages between environment and health to achieve sustainable development; (2) promote an integrated approach to policy-making in the health and environment sectors that values the services that ecosystems provide to human health; and (3) agree on specific actions required to leverage the needed changes in institutional arrangements and investment frameworks for mitigating environmental threats to human health. The result was the Libreville Declaration on Health and Environment in Africa, adopted by ministers of health and environment of 52 African countries. The eleven commitments in the declaration include establishing a health and environment strategic alliance, developing or updating national, sub-regional, and regional frameworks to more effectively address environmental impacts on health, establishing or strengthening health and environment institutions (including supporting research), and other activities to strengthen capacities to identify, monitor and manage environmental health risks and to ensure compliance with international conventions and national regulations.

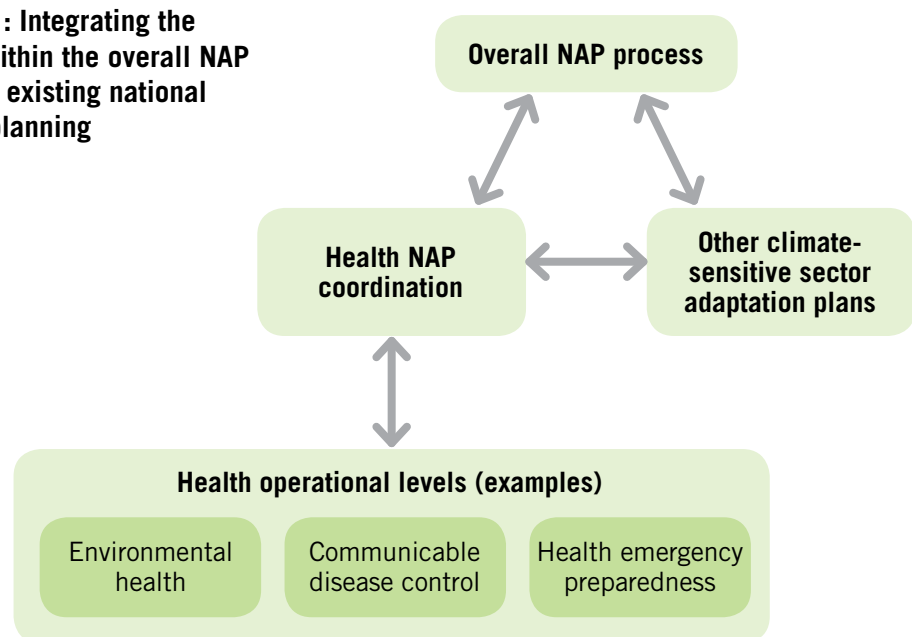
In September 2011, African ministers of health and of environment agreed to implement the framework for Public Health Adaptation to Climate Change (finalized in 2012).<sup>14</sup> The Plan of Action was a response to the request by ministers to WHO, UNEP, the African Development Bank, the African Union Commission, and other development partners, to provide technical assistance to countries for implementation, and to facilitate access by African countries to existing climate funds. Implementation of the framework is the joint responsibility of ministries of health, ministries of environment, and other relevant ministries, under the context of the Health and Environment Strategic Alliance. The guiding principles are evidence-based planning, country ownership and community participation, intersectoral cooperation and collaboration, synergies with other public health initiatives, and advocacy at national and international levels. Implementation requires multisectoral Country Coordination Committees (CCCs); these are national technical and advisory entities to address health and environment issues, including climate change. They are multisectoral, multidisciplinary, and representative of all relevant ministries, and include government representatives, development partners, and civil society. The CCCs coordinate preparation, implementation, monitoring and evaluation of national plans of action. One indicator of progress in implementation is the number of countries that develop or update the health component of their NAPs on the basis of the framework.

<sup>14</sup> *Adaptation to climate change in Africa. Plan of Action for the health sector 2012–2016*. Brazzaville, World Health Organization, 2012. ([http://www.afro.who.int/en/downloads/doc\\_download/7699-adaptation-to-climate-change-in-africa-plan-of-action-for-the-health-sector-2012-2016.html](http://www.afro.who.int/en/downloads/doc_download/7699-adaptation-to-climate-change-in-africa-plan-of-action-for-the-health-sector-2012-2016.html)).

Three components need to be addressed when strengthening institutional arrangement; these correspond to the functional needs of climate change adaptation:

- **Mainstreaming** climate change adaptation into the national health planning process. Adaptation interventions and activities identified within the HNAP will subsequently need to be evaluated, prioritized and implemented through existing programmes. Therefore, the HNAP is a process to be embedded within existing national health processes, rather than as an independent process (Figure 1). Climate variability and change will mainly alter the burden of diseases and other public health conditions that already affect the country. In most cases, national public health programmes are in place to reduce the burden of such diseases and conditions (e.g. national malaria control programmes, maternal and child health programmes, nutrition, water and sanitation, etc.). Every country will have to define its own process, through which mainstreaming of climate change adaptation policies and programmes into specific public health programmes will be undertaken. Therefore, strategies and actions to build resilience through these programmes have to be implemented at the respective operational levels.
- **Implementation** of health adaptation responses. Although a team of climate change and health experts may identify possible adaptation policies and programmes, public health teams at the local, regional and national levels will share responsibility for implementation.
- **Coordination** of the overall health adaptation process. A coordination function will be required to ensure that all adaptation efforts are developed and implemented in accordance with the HNAP. Countries will have to define this coordination function within the ministry of health based on the national context (e.g. designating an existing or establishing a new unit for this purpose).

**Figure 1: Integrating the HNAP within the overall NAP process existing national health planning**



## Box 2: Different institutional arrangements to implement projects on building resilience to climate variability and change

For example, the Pilot Programme on Climate Change Adaptation to Protect Human Health, funded by the Special Climate Change Fund, includes seven countries: Barbados, Bhutan, China, Fiji, Jordan, Kenya and Uzbekistan. The project was designed to build capacity and provide lessons, globally and nationally, in the design, implementation, monitoring and evaluation of specific health adaptation policies and measures. The experiences gained through this project will guide systematic approaches to build resilience to the health risks of climate change within the participating countries and, through knowledge transfer, to other countries as they begin the process of adaptation.

Institutional arrangements vary across these countries for conducting their V&A assessments and for implementing adaptation options to reduce the health risks of climate change. In Bhutan, the Environmental Health Unit, Department of Public Health, Ministry of Health (MoH) is the principal executing agency for the project, which focuses on several health risks from climate change, including risks related to glacier lake outburst floods, controlling the spread of vector-borne diseases, and improving rural water quality and community sanitation. The Environmental Health Unit is the central coordinating body responsible for implementation, liaising with other units, programmes, and ministries. The unit has developed active partnerships within the MoH, including with the Department of Medical Services; the National Vector Borne Disease Control Programme; the Public Health Engineering Division; and Information and Communication Bureau. Outside the MoH, there are strong collaborations with the National Environment Commission (national focal agency for climate change), the Department of Hydro-Met Services under the Ministry of Economic Affairs, and other relevant ministries.

China's policies and measures with respect to climate change are guided by the National Strategy of Replying to Climate Change. Within that guide, the National Institute for Environmental Health and Related Product Safety, Chinese Center for Disease Control and Prevention, has the responsibility to design and implement policies and measures to reduce vulnerability to climate change. This is the executing agency for the adaptation project, which promotes an integrated strategy to improving health adaptation to climate change in China, with a focus on preventing increasing morbidity and mortality during heatwaves. An early output of the project was the establishment of a multisectoral cooperation mechanism including the health sector, meteorological bureau, and environmental protection bureau, with defined roles for collecting data and coordinating information among sectors. Annual National Steering Committee meetings include members from WHO, UNDP, UNEP, MoH, National Development and Reform Commission (NDRC), Ministry of Finance (MoF), Ministry of Science and Technology (MOST), China Meteorological Administration (CMA), Ministry of Environmental Protection (MOEP), Chinese Center for Disease Control and Prevention (CCDC), and CCDC representatives from cities where pilot tests are being conducted of a heatwave early warning system. Each project city has a local project manager who is also a local public health officer; the team includes representatives from the local health bureau, local CCDC, local meteorological bureau, and other local stakeholders.

UNFCCC focal points and diverse ministries, such as environment, planning, finance and other health-determining sectors, may have limited knowledge of how climate change could affect health. Targeting awareness raising activities (e.g. briefings or presentations) about the health risks of climate change to the representatives of the national team coordinating the overall NAP process will help raise the profile of health adaptation.

### **Step 2. Taking stock of available information**

Identify national and subnational research on the health risks of climate variability and change; knowledge of factors increasing/decreasing vulnerability; adaption policies and programmes undertaken; and national and regional capacity gaps to undertaking the HNAP. This step is essentially a ‘SWOT’ (strengths, weaknesses, opportunities and threats) analysis to guide development of the NAP. Special consideration has to be given to potential institutional barriers within the health sector and to capacity needs to ensure the effective implementation of the HNAP.

Information resources can include national communications, NAPAs, situation analysis and needs assessments (SANAs) for the *Libreville Declaration for African countries*, health vulnerability and adaptation assessments, pilot projects on health adaptation, and additional relevant information developed by the health or other sectors. Information gathered during the desk review should be made available to relevant stakeholders, such as through a database created within the overall NAP process.

The process of analysing, mapping and compiling available information will facilitate the identification of gaps in capacity and knowledge. These gaps should be explicitly tackled by including relevant activities in the health adaptation plan. Such analyses should identify areas of expertise that will be needed for the HNAP, including climate data analysis, epidemiology, surveillance and response.

#### **Box 3: Coordination and collaboration around the HNAP**

Institutional barriers for health adaptation range from national decision-makers to local communities. A common barrier in many countries is limited coordination and collaboration across ministries, with each taking decisions to address issues within their sector, often without considering the wider implications. A key approach for reducing this barrier has been the formation of national climate change teams involving all relevant ministries. In some countries, these build on or are related to national disaster risk management coordination committees.

Conducting a HNAP is an opportunity to build collaborations with, for example, the hydro-meteorological services, disaster risk management committees, agriculture, water, and any other ministries or departments with data needed for analysing the health impacts of climate change or for formulating adaptation options (such as early warning systems) to address current and future risks. Memoranda of understanding and other mechanisms for collaboration may need to be negotiated and signed.

Institutional barriers may also exist between the ministry of health or other implementing agency and universities, nongovernmental organizations, community-based organizations, and other potential partners in assessing, designing and implementing adaptation. Identifying these barriers and options for overcoming them is important for conducting a successful HNAP.



### ***Step 3. Identify approaches to address capacity gaps and weaknesses in undertaking the HNAP***

Based on the SWOT analysis and identification of capacity gaps, it is important to ensure that health decision-makers have the necessary capacity to effectively move adaptation planning forward. Countries without comprehensive health V&A assessments might consider conducting one in preparatory elements (Step 4) if resources permit.

## **B) HNAP preparatory elements**

### ***Step 4. Conduct a health V&A assessment, including short- to long-term adaptation needs in the context of development priorities***

This step refers to a comprehensive V&A assessment. WHO guidance on conducting a V&A assessment combines three steps included in the LEG guidance (e.g. analysing current climate and future climate change scenarios; assessing climate vulnerabilities and identifying adaptation options; and reviewing and appraising adaptation options). Data and information gathered in this step will inform subsequent activities in the HNAP.

Most countries have conducted some form of V&A assessment, although few are comprehensive. Differences are evident across regions. For example, the Pacific Island countries were supported by the WHO Western Pacific Regional Office to conduct V&As and develop adaptation plans, while most African countries have yet to conduct their SANAs, which should include an initial assessment of vulnerability to climate change. In some countries, national adaptation strategies are built on the data gathered through the V&A assessment, while others do not have the capacity and/or resources required to conduct a comprehensive assessment, and therefore develop their strategies based on initial evidence and expert judgment.

If a comprehensive health V&A assessment was not conducted prior to initiating the HNAP, it is recommended that one be conducted during this step, if resources permit. If funds are not available, countries are suggested to incorporate a V&A assessment into their plans, as a key resource for informing their national strategies and/or plans of action, as well as providing a baseline against which the effectiveness of future interventions will be measured. The scope of the assessment will be determined by national circumstances and should include relevant stakeholders for understanding drivers of climate-relevant health outcomes and for identifying policies and programmes to reduce current and projected risks. Given the technical nature of this assessment, stakeholders included may differ from the ones involved in the overall NAP process, and may include national research institutions, public health organizations, universities, and nongovernmental organizations. It also is important to include stakeholders who understand key issues that cut across sectors, such as food or water security. Because the V&A assessment includes developing a communication plan, it is important to involve the media as a key stakeholder.

## Box 4: Protecting health from climate change: Vulnerability and adaptation assessment

In response to the request in 2008 from the World Health Assembly for WHO to support countries in strengthening actions to protect health from climate change, WHO and the Pan American Health Organization (PAHO) built on past guidance and technical tools to outline a flexible process for vulnerability and adaptation assessment.<sup>15</sup> The guidance is designed for countries to assess which populations are most vulnerable to different kinds of health effects, to identify weaknesses in the systems that should protect them, and to specify interventions to respond. Further, the resulting assessments can improve evidence and understanding of the linkages between climate and health, serve as a baseline analysis against which changes in health risk and protective measures can be monitored, provide the opportunity for building capacity, and strengthen the case for investment in health protection.

The steps in conducting an assessment should be responsive to the country context and needs, which will determine what steps to conduct and the appropriate order. The basic components of an assessment are:

### 1. Frame and scope the assessment:

- define the geographical region and health outcomes of interest;
- identify the questions to be addressed and steps to be included;
- identify the policy context for the assessment;
- establish a project team and management plan;
- establish a stakeholder process;
- develop a communication plan.

### 2. Vulnerability assessment: Describe the human health risks of current climate variability and recent climate change, and the public health policies and programmes to address the risks. This includes:

- describing the current risks of climate-sensitive health outcomes, including the most vulnerable populations and regions;
- describing the current capacity of health and other sectors to address the risks of climate-sensitive health outcomes.

### 3. Impact assessment: Project future health risks and impacts under climate change. This includes:

- describing how the risks of climate-sensitive health outcomes, including the most vulnerable populations and regions, may change over coming decades, irrespective of climate change;
- estimating the possible additional burden of adverse health outcomes due to climate change.

### 4. Adaptation assessment: Identify and prioritize policies and programmes to address current and projected health risks. This includes:

- identifying additional public health and health care policies and programmes to prevent likely future health burdens;
- prioritizing public health and health care policies and programmes to reduce likely future health burdens;
- identifying human and financial resources needed for implementation and potential challenges to be addressed;

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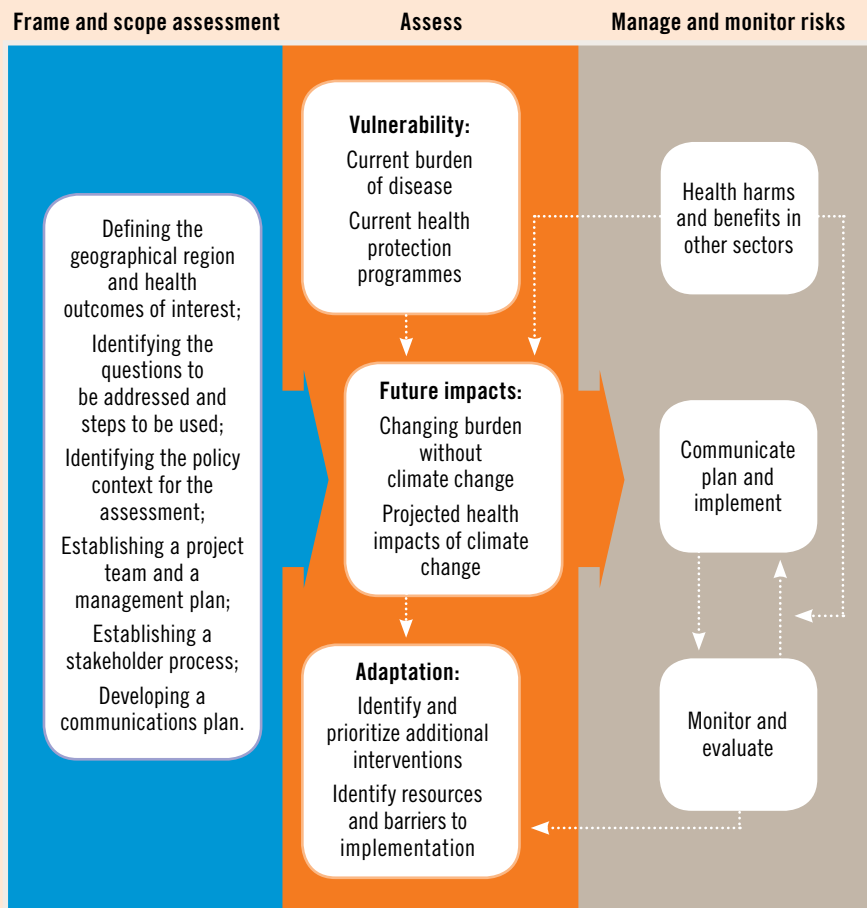
<sup>15</sup> *Protecting health from climate change. Vulnerability and adaptation assessment.* Geneva, World Health Organization, 2012 (<http://www.who.int/globalchange/resources/adaptationresources/en/>).

- estimating the costs of action and of inaction;
- identifying possible policies and programmes to reduce the potential health risks of adaptation and greenhouse gas mitigation policies, and programmes implemented in other sectors.

### 5. Establish an iterative process for monitoring and managing the health risks of climate change.

These steps are shown in Figure 2.

**Figure 2. Vulnerability and adaptation assessment process**



Health risks that could be included in the assessment include: vector-borne diseases; nutrition and foodborne diseases; waterborne diseases; airborne and respiratory diseases; occupational health; extreme weather and climate events (e.g. extreme temperatures, droughts, floods). These categories are illustrative rather than exhaustive; the country context will determine which groups are included. Because climate is one of many drivers of these health outcomes, it is important to also consider, where appropriate, environmental determinants of health (e.g. different geographical settings); gender (and equity) and other social determinants of health; and health systems resilience.

The vulnerability component of the assessment evaluates the current burden of climate-relevant diseases and the ability to effectively manage those burdens (e.g. the baseline situation). The impact assessment projects how future health risks could change under

different scenarios of future climate variability. The adaptation assessment aims to identify adaptation policies and programmes to address current and projected health risks, and to prioritize adaptation options based on approaches that can include costs, benefits, opportunities for implementation, and barriers or obstacles.

### Box 5: Conducting a health V&A in Mongolia

Mongolia conducted a health V&A in 2009 with the goal of determining the associations between weather and climate and health, and to use that information to make recommendations for further action.<sup>16</sup> The specific objectives were to analyse associations between weather and climate and the health impacts of air quality, water availability and quality, extreme weather events, and infectious diseases. Associations were analysed to understand morbidity and mortality trends in relation to weather patterns, to identify key vulnerabilities, and to develop recommendations for adaptation and mitigation strategies to manage the health risks of climate change.

Extensive data sets were collected from relevant ministries and analysed for each topic, quantifying exposure-response relationships, identifying vulnerable groups, and recommending policies and measures to increase resilience to climate change. For example, the recommendations for air quality were as follows.

1. Revision and improvement of legislative environment:
  - a. review and change relevant laws;
  - b. add the issue of climate change and health to the national security concept;
  - c. develop and implement strategy and programme.
2. Improvement of air quality monitoring to:
  - a. measure O<sub>3</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO;
  - b. increase number of monitoring stations.
3. Expansion of cooperation to improve research capacity.
4. Health sector strengthening on health data reporting system (to provide daily morbidity and mortality data).
5. Early warning system on climate change and air pollution.
6. Training and education on climate change and air pollution.

Assessment of the risks of climate change is an iterative process rather than a stand-alone activity, which has to be properly reflected in the health adaptation plan. This iterative process facilitates adjustments to effectively build resilience of health systems to changing weather patterns and to respond to new evidence and knowledge of trends, projections and best practices in adaptation.

### ***Step 5. Review implications of climate change on health-related development goals, legislation, strategies, policies and plans***

Health system strengthening is a priority development objective for most countries, including LDCs, so may be the main entry point for planning health adaptation

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<sup>16</sup> Hong Y-C, Kim H, Cheong HK, Honda Y. *Climate Change and Health: Mongolia*. 2009.

interventions. Health system building blocks may be used as a framework to link climate change adaptation planning to national development goals (i.e. service delivery; health workforce; health information systems; and leadership/governance; access to medicines; and health systems financing<sup>17</sup>). Because the intention is to build the resilience of existing health programmes, it is vital to ensure coordination with and relevant support for these programmes, such as vector-borne diseases, infectious diseases, noncommunicable diseases, nutrition, and so on. It is not intended for the HNAP to create parallel structures for managing the health risks of climate change.

Coordination with health-determining sectors is also critical to identify potential synergies and promote health co-benefits. An option to facilitate this coordination is to include health indicators within the monitoring systems of those sectors. Further details on indicators will be made available under the WHO operational framework to support health-oriented climate change adaptation. Some examples are included in the section related to monitoring and evaluation below.

### Box 6: The importance of collaboration across sectors

Public health and health care institutions are not the sole determinants of the health of populations. Agriculture, water, ecosystems, energy, infrastructure, disaster management, meteorology, and other ministries and departments take actions that can promote or inhibit population health. Choices made on enhancing crop yields through irrigation or microdams could not only reduce food insecurity, but also can provide breeding grounds for mosquitoes, snails, and other vectors. In another example, technologies to conserve water can have important health implications. Wastewater is commonly used for agricultural irrigation in low-income settings, because freshwater supplies are typically limited and because of the nutrient value of wastewater. These practices are associated with risks to the health of farm workers, consumers, and local communities. Increasing collaboration across sectors means that health professionals can provide input to policies and programmes before negative health consequences arise.

### **Step 6. Develop a national health adaptation strategy that identifies priority adaptation options**

This step includes developing a national strategy within a NAP. Based on their national context and needs, countries will determine the process to be followed for proposing a strategy and plan to minimize the adverse health risks of climate change and to build the resilience of the health system. This guidance assumes that countries vary in the amount of efforts undertaken on climate change and health. Although there is no unique approach for developing a NAP, having an in-depth assessment of health vulnerability and risks of climate change is a key target for all countries to inform sound adaptation responses. Having a comprehensive assessment will facilitate more detailed adaptation plans. Countries without such an assessment should include this as a first activity in their plan (see Step 4).

<sup>17</sup> *Monitoring the building blocks of health systems. A handbook of indicators and their measurement strategies.* Geneva, World Health Organization, 2010.

The national health strategy is the document that includes the broad strategies to tackle the adverse health risks of climate change, based on information from the V&A assessment. These strategies could be included in the HNAP, in order to have one document containing both the objectives and the detailed plan of action. Whatever format is chosen, the document containing national priorities to build health system resilience to climate change should include detailed institutional arrangements to implement and engage relevant stakeholders, a monitoring and evaluation framework, and clear immediate, medium-, and long-term health adaptation goals.

### Box 7: Climate change and health strategy and action plan in the Former Yugoslav Republic of Macedonia

The Former Yugoslav Republic of Macedonia developed a Climate change *health adaptation strategy and action plan* within its legislative framework that:

*envisages objectives and activities that will be carried out by the health sector in cooperation with the other relevant sectors in the country. Its goal is to interlink with other strategies in this area developed by other sectors and to form part of the chain of activities aimed at reducing the impact of climate change on people's health...*

The general goal of the strategy is to plan health adaptation measures to prevent and/or overcome existing and future risks, and to respond promptly to climate change risks for health and well-being. Specific goals include:

- Provide a coordinated approach and functional cooperation between the sectors and the relevant institutions in terms of effective and efficient use of available resources.
- Raise public awareness about climate change and its effect on health.
- Establish an integrated, efficient, and effective approach for prevention, early warning, and management of the health effects of heatwaves.
- Establish control and preventive measures to effectively manage health risks due to elevated concentrations of air pollution and to cold weather.
- Establish an integrated, efficient and effective approach for prevention, early warning, and management of the health effects of floods and fires.
- Control and prevent pollen-associated allergic diseases exacerbated by climate change.
- Establish an integrated, efficient and effective approach for prevention, early warning, and management of the health effects of increased UV radiation due to climate change.
- Protection from climate change-related communicable diseases.

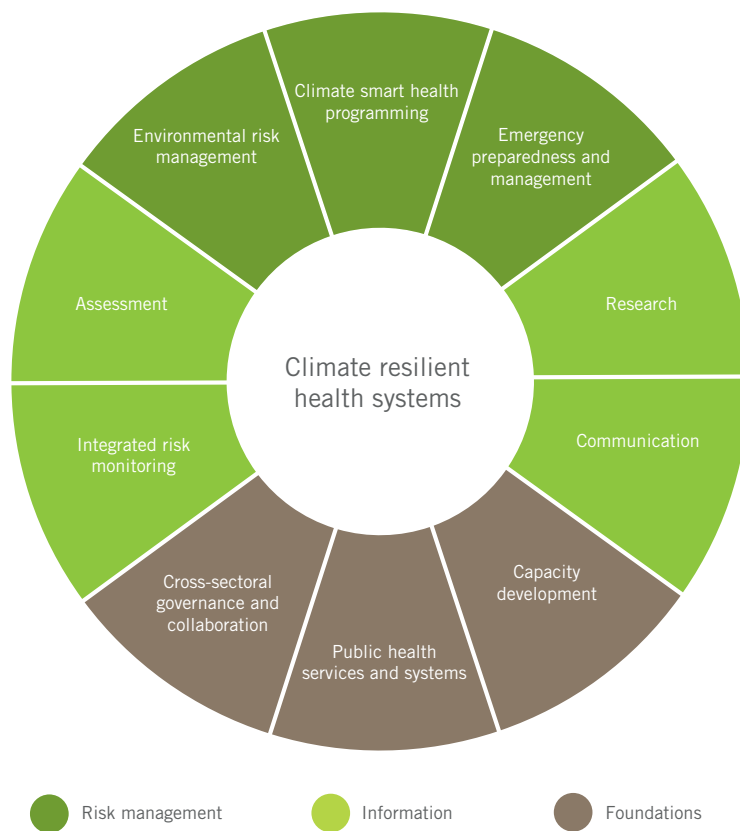
Based on a V&A assessment, priority areas of action are:

- Raising awareness of climate change and its effects on health.
- Identifying, registering and monitoring climate change and health risks.
- Improving health system promotion, prevention and timely response to climate change and health risks.

The Ministry of Health is in charge of monitoring and implementation of the strategy and action plan. The Strategy identifies actions for each goal, a time frame for implementation, responsible institutions, indicators for monitoring and evaluation, and financial implications.

Once the broad health strategic goals are defined within the national strategy, a **health adaptation plan** needs to be developed that specifies how to achieve those goals over a specified period of time. Depending on the context, the plan may include expected results, milestones, the sequencing of activities, clear responsibilities for implementation, necessary human and financial resources, costs and benefits of interventions, and financing options. The plan could be a useful tool to raise additional funds, if required. The WHO operational framework for building climate-resilient health systems considers ten main components grouped into three categories, namely, foundations, information and risk management. The ten components are highlighted in Figure 3.

**Figure 3. Ten key components for building climate resilience (Adapted from the WHO Operational framework for building climate-resilient health systems).**



Because the NAP process was designed to provide support to countries, mainly LDCs, to respond to their medium- and long-term adaptation needs, the proposed components for building climate-resilient health systems reflect not only urgent priorities for adaptation actions but also actions to be implemented over longer time periods. Countries should decide the appropriate timeframe for their HNAPs in order to align them with national or regional planning processes. Normal planning periods range from two to five years.

### Box 8: Estimating the costs of adaptation in various sectors

The WHO Regional Office for Europe prepared an economic analysis tool to support health adaptation planning in European Member States<sup>18</sup>. The tool provides step-by-step guidance on estimating the costs of adaptation in various sectors to protect health from climate change. Data required includes all planned interventions that contribute to minimizing the impacts of climate change on a particular health outcome, including those implemented in other sectors, such as improving water supply and wastewater treatment to address climate change threats; and the number of cases and deaths likely to be averted by the interventions. Specifically for each adaptation, data are needed on the resource use actions; responsible implementing agency; percentage of final cost incurred by different agencies; actual resource use and unit cost; economic cost; financial cost; period of validity; and time period. The costing tool (available from WHO Euro)<sup>19</sup> is then used to calculate the total annualized costs of adaptation, including one-off investments. It does so for several types of cost disaggregation (i.e. distinguishing financial from economic costs, distinguishing costs by who would pay, and distinguishing when a given cost would have to be paid). The data can be obtained from existing national (or subnational) V&A assessments or from studies of specific health outcomes.

## C) Implementation strategies

### *Step 7. Develop an implementation strategy for operationalizing HNAPs and integrating climate change adaptation into health-related planning processes at all levels, including enhancing the capacity for conducting future HNAPs*

The HNAP offers the opportunity to ensure that the health risks of climate change are considered in health planning from national to local scale.

### Box 9: Integrating climate change and health in all planning levels: the case of Jordan

Jordan provides an example of integrating climate change and health concerns into all levels of planning. A major concern identified in a V&A assessment was the heavy and increasing use of treated wastewater in agriculture, which poses potential risks to human health. Climate change is projected to exacerbate this risk by reducing water availability by 20–40% over the next half century in a country ranked among the poorest countries in the world in water availability, with a current per capita availability of 75 L/day, far below the water poverty line. An adaptation project, funded as part of the Pilot Programme on Climate Change Adaptation to Protect Human Health focused on adaptive measures to ensure the >>

<sup>18</sup> WHO Regional Office for Europe. Climate change and health: a tool to estimate health and adaptation costs. WHO Regional Office for Europe. Denmark, 2013. <http://www.euro.who.int/en/health-topics/environment-and-health/Climate-change/publications/2013/climate-change-and-health-a-tool-to-estimate-health-and-adaptation-costs>

<sup>19</sup> WHO Regional Office for Europe. Climate change and health: a tool to estimate health and adaptation costs. WHO Regional Office for Europe. Denmark, 2013. <http://www.euro.who.int/en/health-topics/environment-and-health/Climate-change/publications/2013/climate-change-and-health-a-tool-to-estimate-health-and-adaptation-costs>



increased use of a potentially hazardous practice does not result in increased risks to human health, through: (i) strengthening monitoring and surveillance capacity; (ii) developing the necessary institutional and regulatory framework for safe use of wastewater; and (iii) increasing the capacity to implement health protection measures. The executing agency of the project is the MoH, working in close cooperation and coordination with the Ministry of Water and Irrigation and the Ministry of Environment.

An overall National Adaptation Strategy and Plan of Action to Protect Health from Climate Change was developed in 2012 partially based on the analyses and implementation efforts that were part of this adaptation project. This strategy then fed into the National Climate Change Policy of the Hashemite Kingdom of Jordan 2013–2020, which notes the climate change strategic objectives in the health sector, and health sector priorities, main measures, and instruments. Among the priorities are to:

- Review and update the Ministry of Health's strategy to consider the conclusions of the adaptation and action plan for climate change adaptation in the health sector.
- Strengthen the dialogue between the health and water sector on climate change impact and adaptation (on ministerial and research levels).
- Ensure the participation of the health sector when planning climate change adaptation in other sectors.
- Implement the National Adaptation Strategy and Plan of Action to Protect Health from Climate Change by prioritizing and implementing the 24 projects identified in the health sector.

A key component of the implementation phase is to ensure that the health sector is connected with the overall NAP process through proper representation and engagement in the process and by periodic communications of progress made in health adaptation implementation.

Strengthening the capacity of development and health planners is required to ensure an enabling environment exists for implementation of the health component of the NAP. If needed, the capacity of staff involved in the implementation of the HNAP can be strengthened in climate change and health issues, as well as in project management.

The HNAP is envisaged as a process embedded within national health processes and existing programmes rather than as an independent process. Climate variability and change will primarily affect the burden of climate-relevant diseases that are already present in a given country or setting. Because, in most cases, control programmes for such diseases already exist, it will generally be more efficient to build the resilience of these programmes to climate change through appropriate modifications than to initiate new programmes. Involving relevant stakeholders will be crucial.

### Box 10: Potential sources of funding for climate change adaptation

A key activity for implementing priority adaptation options is to identify financing options. WHO, UNDP, UNEP, UNISDR (UN International Strategy for Disaster Reduction), and other international and regional organizations can provide information on possible funding opportunities.

There is a wide range of potential funding sources, from national to bilateral to multinational organizations, and from nongovernmental organizations and other sources. The adaptation funds under the UNFCCC are a significant international source of adaptation funding. The four funds (Least Developed Country Fund, Special Climate Change Fund, Adaptation Fund, and Green Climate Fund) have different rules and accessing mechanisms. The national climate change team in a given country will have information on accessing these funds.

Many bilateral aid organizations provide adaptation funding, including the UK Department for International Development, US Agency for International Development, and development organizations from high-income countries. Some of their adaptation funding may go through another organization, such as the Climate and Development Knowledge Network etc.

National governments and nongovernmental organizations also may have adaptation funding.

### ***Step 8. Promote coordination and synergy with the NAP process, particularly with sectors that can affect health, and with multilateral environmental agreements***

This step includes coordinating adaptation plans of health-determining sectors within the overall NAP process and linking the HNAP with regional and national health planning processes and multilateral environmental agreements.

Coordination with health-determining sectors is critical to identify potential synergies and promote health co-benefits. An option to ensure this coordination is the inclusion of health indicators within the monitoring programmes of those sectors. Further details on indicators will be made available under the WHO *Conceptual framework for indicators to support health-oriented climate change adaptation*. Ensuring implementation is coordinated across sectors will avoid overlapping and help to maximize efficiency in health gains from adaptation and mitigation. Proper planning and budgeting of these activities will be needed.

### Box 11: Health impacts of extreme weather and climate events

Extreme weather and climate events can have impacts on multiple sectors, across local, national, regional and international scales. Impacts can be the direct result of the event itself, from the response to the event, or through indirect impacts such as a reduction in food production. In any case, intersectoral coordination and collaboration are often required to address health impacts. >>

An example is prolonged drought in Syria that affected 1.3 million people with up to 800 000 severely affected in 2008–2009. There were significant losses of rain-fed and irrigated winter grain crops. Wheat production decreased almost 50%, with most farmers who depended on rain-fed production suffering complete or near-total loss of crops. Herders lost around 80% of their livestock due to barren grasslands. Combined with an increase in the price of food and basic resources, many affected households could not afford basic supplies or food, thus increasing the rate of malnutrition, particularly among pregnant women and children under five. Inadequate consumption of micro- and macronutrients in the most affected households meant the average diet contained less than 15% of the recommended daily fat intake and 50% of the advised energy and protein requirements. One of the most visible effects of the drought was the migration of 40 000 to 60 000 families from the affected areas. Multisectoral responses included food and agriculture assistance, water and health interventions, and measures aimed at increasing drought resilience.

## D) Reporting, monitoring and review<sup>20</sup>

### *Step 9. Monitor and review the HNAP to assess progress, effectiveness and gaps*

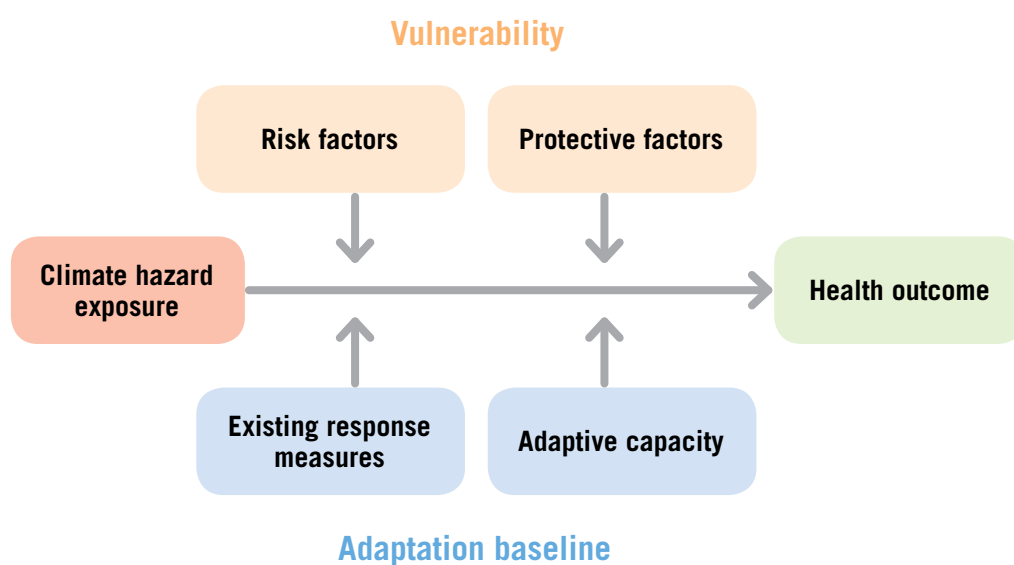
The HNAP aims to strengthen national health information systems and to align global monitoring and reporting systems on the health risks of climate variability and change across countries. Design of a national monitoring and evaluation system for health adaptation to climate variability and change should be based on the HNAP and related programmes, taking into account the outcomes and impacts of interventions considered to determine what should be monitored and how. This implies that a set of climate-related disease and programme-specific indicators will be designed. Data sources should be included in the M&E framework, which should clearly define concrete milestones and be aligned with the health adaptation strategy and plan, based on both output and outcome indicators. Monitoring should be designed for iterative and regular evaluation to allow the introduction of corrective measures when needed. Annual, mid-term, and final review of the implementation of the NAP and programmes should be considered.

Quantitative measures and indicators are priorities to increase the evidence base. In addition, qualitative metrics are strongly recommended to capture social dimensions such as gender, and perceptions related to vulnerability and adaptive capacity.

The national M&E framework should incorporate a range of indicators of health vulnerability and risks of climate change, informed by analyses of the diverse pathways by which climate variability and change could affect health, and understanding of the different factors that determine vulnerability to those risks. Figure 4 outlines the pathway by which climate change can result in adverse health impacts. Health outcome data should be at least age- and sex-disaggregated in order to identify high-risk population subgroups and to facilitate design of tailored interventions. Other disaggregation may be appropriate depending on the context. Analysis of indicator profiles (including roles,

<sup>20</sup> Murray, V. et al, 2012: Case studies. In: *Managing the risks of extreme events and disasters to advance climate change adaptation* [Field, C.B. et al (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC). Cambridge/New York, Cambridge University Press, 2012.

**Figure 4: Information categories for indicators on causal pathway from climate hazards to health outcomes**



methods, definitions and scale of application) will be included under the conceptual framework for indicators mentioned above.

Monitoring health outcomes provides the opportunity to assess whether the coping and adaptation measures implemented are effective in reducing climate-related health burdens. Monitoring climate-related diseases provides health outcome data essential for evaluating the extent to which adaptation policies and programmes are effective.

While mainly health indicators will be included in the M&E plan to measure the impact of the HNAP and related programmes, a wide range of information and data are needed to create a baseline against which future success can be measured and to inform the design of specific adaptation options. Essential baselines for monitoring the health risks of climate change include those that will determine different degrees of vulnerability, and may be related to health (e.g. priority climate-related diseases), environment (e.g. climatic variables), socioeconomics (e.g. poverty, demographics and occupation), and current level of interventions and health systems capacity.

Figure 4 (above), illustrates how the various information categories can be combined in a conceptual indicator framework to provide information on the causal pathway of risk and protective factors that lead from exposure to adverse health effects. Baseline and target indicators can be inferred from these information categories as shown in the Table below. This information will be informative as to which subpopulations are vulnerable and where they are located, as well as to the range of adaptation options relevant to reducing the ultimate burden of disease.

**Table: Example of essential baselines for monitoring the effects of climate change on malnutrition**

Sector	Factor	Measure	Existing resource
Health	Health effect of malnutrition in children <sup>21</sup>	% of children underweight (weight for age below 2 SD of WHO Child Growth Standards median) <sup>22</sup> % of stunted children (height for age below 2 SD of WHO Child Growth Standard median) % or number of newborns (x 1000) with low birth weight (<2500 grams)	WHO Nutrition Landscape Information System (NLIS) ( <a href="http://www.who.int/nutrition/nlis/en/">http://www.who.int/nutrition/nlis/en/</a> )
	Vitamin and mineral deficiencies	% or number (x1000) of children with anaemia younger than the age of 5 years % of clinical vitamin A deficiency in women % of households consuming adequately iodized salt - 15 parts per million or more	WHO Nutrition Landscape Information System (NLIS) ( <a href="http://www.who.int/nutrition/nlis/en/">http://www.who.int/nutrition/nlis/en/</a> ) ( <a href="http://www.who.int/hia/green_economy/indicators_food.pdf">http://www.who.int/hia/green_economy/indicators_food.pdf</a> )
	Nutritional status	Proportion of undernourished (as a percentage of the total population)	IFPRI Global Hunger Index ( <a href="http://www.ifpri.org/book-8018/ourwork/researcharea/global-hunger-index">http://www.ifpri.org/book-8018/ourwork/researcharea/global-hunger-index</a> )
	Food-borne illnesses	Prevalence of foodborne diseases Incidence of foodborne disease outbreaks Proportion of foods marketed that comply with international trade standards for hormone, pesticide, antibiotic residues as well as other chemical, microbiological food safety parameters.	WHO GEMS Food Contamination Monitoring and Assessment Programme ( <a href="http://apps.who.int/nutrition/landscape_analysis/nlis_gem_food/en/index.html">http://apps.who.int/nutrition/landscape_analysis/nlis_gem_food/en/index.html</a> ) ( <a href="http://www.who.int/hia/green_economy/indicators_food.pdf">http://www.who.int/hia/green_economy/indicators_food.pdf</a> )
	Infant and young child feeding	% of infants under 6 months of age who are exclusively breastfed % of infants aged 6–8 months who receive solid, semi-solid or soft food % of children aged 6–23 months who receive a minimum acceptable diet	WHO Nutrition Landscape Information System (NLIS) ( <a href="http://www.who.int/nutrition/nlis/en/">http://www.who.int/nutrition/nlis/en/</a> )
	Health interventions and adaptation responses	% of women receiving daily iron (60mg) and folate (400µg) supplements during pregnancy % of children with diarrhoea receiving oral rehydration therapy and continued feeding Number of occupational trainings conducted to facilitate search for new livelihood opportunities	WHO Nutrition Landscape Information System (NLIS) ( <a href="http://www.who.int/nutrition/nlis/en/">http://www.who.int/nutrition/nlis/en/</a> ) ( <a href="http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf">http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf</a> )
Environment	Climate	Annual freshwater withdrawals, total (billion cubic metres) Agricultural irrigated land (% of total agricultural land) Early warning systems on reduced rainfall and emerging food safety crisis situations (e.g. FEWS)	UNDP Country Climate Change Profiles ( <a href="http://www.geog.ox.ac.uk/research/climate/projects/undp-cp/">http://www.geog.ox.ac.uk/research/climate/projects/undp-cp/</a> ) World Bank Climate Change Knowledge Portal ( <a href="http://sdwebx.worldbank.org/climateportal/index.cfm">http://sdwebx.worldbank.org/climateportal/index.cfm</a> ) ( <a href="http://data.worldbank.org/indicator">http://data.worldbank.org/indicator</a> ) ( <a href="http://www.epa.gov/climatechange/pdfs/climateindicators-full-2012.pdf">http://www.epa.gov/climatechange/pdfs/climateindicators-full-2012.pdf</a> ) >>

<sup>21</sup> Children younger than the age of five years.

<sup>22</sup> The percentage can be substituted by absolute numbers (i.e. x1000 children).

Sector	Factor	Measure	Existing resource
Environment	Water	Proportion of population accessing improved drinking-water sources and sanitation  Increased availability of at least 20l per person per day from a source within 1km of user's dwelling  Number of countries that report proportion of population using piped water on premises for the last 12 months <sup>23</sup>	WHO Nutrition Landscape Information System (NLiS): <a href="http://www.who.int/nutrition/nlis/en/">http://www.who.int/nutrition/nlis/en/</a>  <a href="http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf">http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf</a>  JMP report 2013 <a href="http://apps.who.int/iris/bitstream/10665/81245/1/9789241505390_eng.pdf">http://apps.who.int/iris/bitstream/10665/81245/1/9789241505390_eng.pdf</a>
Agriculture	Food availability and access	Average amount of food available for human consumption (based on FAO <i>National food balance sheets</i> )  % of the poorest quintile with access to food (both in rural and urban settings)  % of the richest quintile with access to food	FAOSTAT: <a href="http://faostat.fao.org/">http://faostat.fao.org/</a>  WHO Nutrition Landscape Information System (NLiS): <a href="http://www.who.int/nutrition/nlis/en/">http://www.who.int/nutrition/nlis/en/</a>
Socio-economics	Food affordability	Cost ratio of a minimum daily food basket to the average daily income	World Bank Data: <a href="http://data.worldbank.org/">http://data.worldbank.org/</a>
	Poverty	Proportion of population with income below US\$1 per day  % of population who diversifies their sources of food and income	WHO Nutrition Landscape Information System (NLiS): <a href="http://www.who.int/nutrition/nlis/en/">http://www.who.int/nutrition/nlis/en/</a>  Millennium Development Goals indicators database: <a href="http://mdgs.un.org/unsd/mdg/Default.aspx">http://mdgs.un.org/unsd/mdg/Default.aspx</a>
	Livelihoods	% of population with occupation and dependence on agricultural assets, on an individual and community scale  Number of low-to-medium income groups who may lose homes, store food, personal possessions and means of obtaining livelihoods	World Bank Data: <a href="http://data.worldbank.org/">http://data.worldbank.org/</a>  <a href="http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf">http://www.fao.org/forestry/15538-079b31d45081fe9c3dbc6ff34de4807e4.pdf</a>
	Health expenditure	General government expenditure on health as a percentage of total government expenditure  Per capita total expenditure on health (US\$)  % of out-of pocket per capita expenditures on health	WHO Nutrition Landscape Information System (NLiS): <a href="http://www.who.int/nutrition/nlis/en/">http://www.who.int/nutrition/nlis/en/</a>

#### Cross-cutting issues to be considered:

- Environmental determinants of health (e.g. different geographical settings, urban vs rural environments, and housing).
- Gender, equity and other social determinants of health.
- Resilience of health systems (e.g. availability and accessibility of health services, climate-resilient and health promoting strategies in health care facilities, new climate-resilient hospitals built, built environments not prone to flooding).<sup>24</sup>

In addition to monitoring, ex-post evaluations of implementation of the HNAP and related programmes are highly recommended. These evaluations should provide information on relevance, effectiveness, efficiency, sustainability and impact.

<sup>23</sup> For urban areas excluding protected dug wells and protected springs.

<sup>24</sup> *Atlas of health and climate*. Geneva, World health Organization/World Meteorological Organization, 2012.

The HNAP aims to strengthen global, regional and national health information and reporting systems. In order to facilitate global monitoring and reporting, basic standards for reporting on health adaptation at the national level should be compatible among regions and countries. Climate-relevant health indicators should be integrated within the national health information system. Furthermore, the HNAP should facilitate and promote the inclusion of health-related indicators within the adaptation monitoring systems of health-determining sectors.

### ***Step 10. Update the health component of the National Adaptation Plans in an iterative manner***

Managing the health risks of climate change will require regular revision of the HNAP to take into account experience gained with implementing adaptation options, new knowledge and understanding of climate variability and change and its health risks that, and changes in institutional structures, available technologies, demographics, etc. The team conducting the HNAP should recommend the time frame for considering updating the process and outputs. One possible opportunity is when the NAP is being revised. The HNAP should be flexible, conducting updates whenever major changes occur that could alter the previous conclusions and approaches to adaptation, such as a breakthrough technology in disease control or new climate change projections that suggest changes in vulnerability.

### ***Step 11. Outreach on the HNAP process, including reporting on progress and effectiveness***

To effectively integrate the health adaptation process within the overall NAP process, it is critical to periodically communicate and report to different stakeholders on the progress made on implementing the HNAP and related programmes. Stakeholders include representatives of the management unit of the overall NAP at national level, the LEG, UNFCCC and WHO.

It is expected that the NAP process will clearly define the reporting requirements and the time frame to do so. Reporting requirements established under the relevant climate change processes should be aligned with those in place for health data generation, compilation, analysis, synthesis, communication, and use for decision-making.<sup>25</sup>

In addition to reporting on the overall national adaptation process, it is recommended to report on progress made on health adaptation via global processes under the UNFCCC mechanisms, such as through the National Communications.

Finally, reporting to the relevant health processes and programmes is key to ensure successful mainstreaming of health adaptation to climate change. Reporting to WHO will facilitate global monitoring, reporting and outreach based on the indicators selected at the national level.

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<sup>25</sup> *Monitoring, evaluation and review of national health strategies*. Geneva, World Health Organization/International Health Partnership, 2011.

# Notes



# Notes

# Notes



## PUBLIC HEALTH AND ENVIRONMENT

This guide is targeted towards decision makers in charge of planning adaptation actions for health protection from climate variability and change. Having the UNFCCC in general, and the NAP process in particular, as a framework, the present guidance aims to ensure that the health sector works with partners in the environment and other related communities, and follows a systematic process to:

1. Engage in the overall NAP process at the national level.
2. Identify national strategic goals for building health resilience to climate change (if countries have not done so through, for example, a National Health Adaptation Strategy).
3. Develop a national plan with prioritized activities to achieve these goals, within a specific time period and given available resources.

The guidance outlines the process to be followed to ensure these goals are achieved. In addition, further guidance on how to plan for building climate resilient health systems at country level is provided.

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