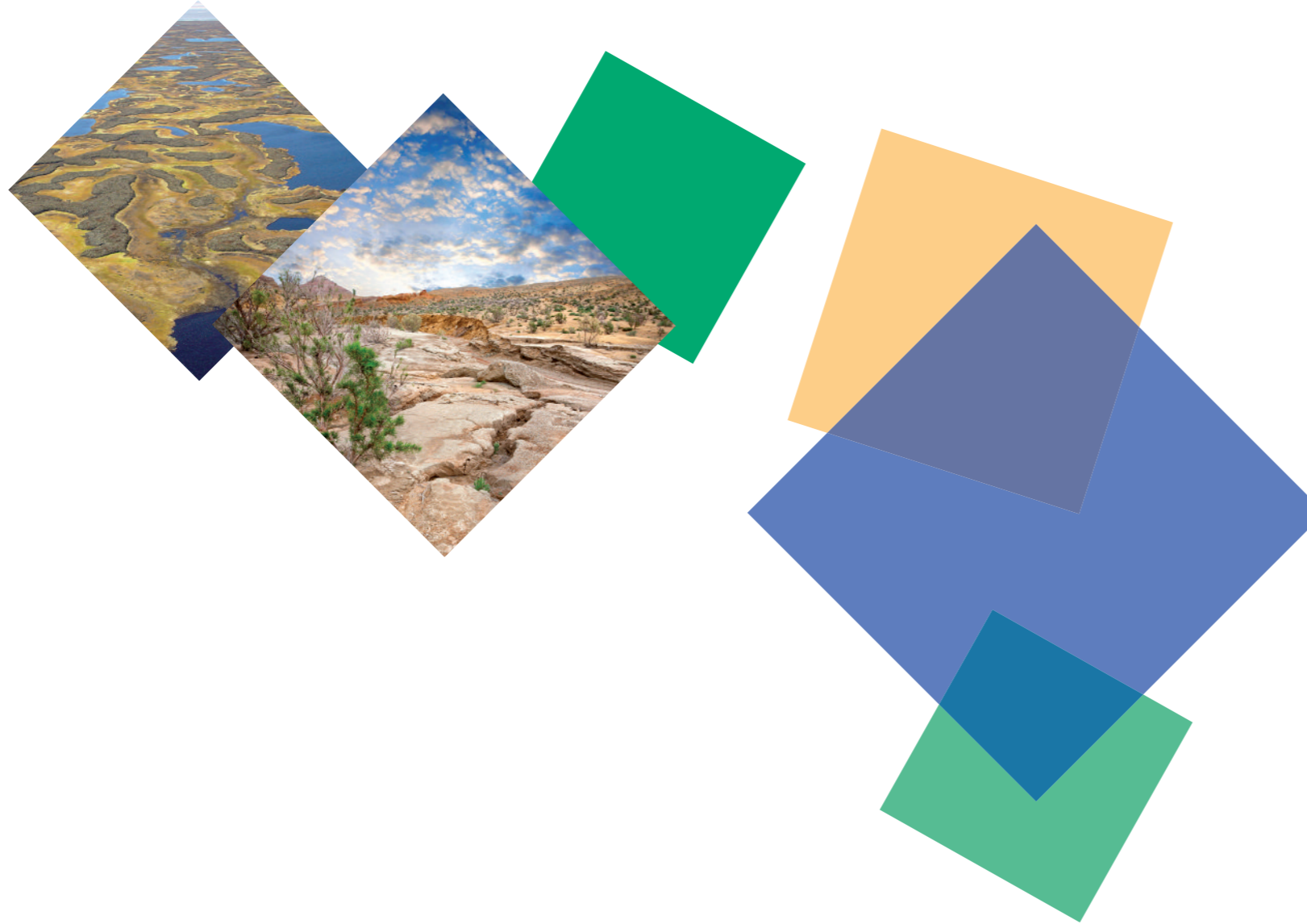


# PROTECTING HEALTH FROM CLIMATE CHANGE

**A seven-country initiative**



# PROTECTING HEALTH FROM CLIMATE CHANGE

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## ABSTRACT

This publication presents the results of a seven-country initiative of the WHO Regional Office for Europe aimed to protect health from climate change through addressing adaptation, strengthening health systems and building institutional capacity in Albania, Kazakhstan, Kyrgyzstan, Russian Federation Tajikistan, the former Yugoslav Republic of Macedonia and Uzbekistan.

This project is part of the International Climate Initiative (ICI). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative based on a decision adopted by the German Bundestag.

### Keywords

Climate change  
Environment and public health  
Environmental health  
Environmental policy  
Meteorological factors  
Sustainability

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## FOREWORD

Over the past decade, there have been significant advances in understanding the effects that climate change can have on health. Such impacts have been observed and documented in several countries of the WHO European Region, but their scale is continuously changing. This situation is compounded by the additional stresses that climate change exerts on already strained resources and fundamental determinants of good health such as food security, water safety and air quality. It is within this context that the WHO Regional Office for Europe undertook the largest pilot project on climate change and health.

This seven-country initiative aimed to protect health from climate change through addressing adaptation, strengthening health systems and building institutional capacity in Albania, Kazakhstan, Kyrgyzstan, Russian Federation Tajikistan, the former Yugoslav Republic of Macedonia and Uzbekistan. The project was supported financially by the International Climate Initiative (ICI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

Several countries have introduced multisectoral processes to address climate change and health within their implementation of the United Nations Framework Convention on Climate Change (UNFCCC). Such processes are promising when linked to a wider array of health and development themes but there has been a call for scaling up work in countries in an effort to tackle climate change. Creation of resilient communities was identified as a priority area in the WHO Regional Office for Europe's *Health 2020: policy framework and strategy* (2012). Within this theme, one of the seven-country initiative's major strengths is the all-society approach to awareness raising, capacity building and intersectoral policy development.

Health systems' potential for adaptation has not yet been fully realized. Most current health systems can deal with existing problems but must be prepared for the challenges of a changing climate. This need for relevant adaptation has been widely recognized at the ministerial conferences on environment and health. Member States of the WHO European Region declared their commitment to act on environmental health, including climate change, at the most recent conference in Parma in 2010.

Albeit a pilot, the seven-country initiative has already provided a wealth of valuable information and policy lessons for the whole WHO European Region. The methodology and tools developed throughout this initiative are based on well-established frameworks and adapted to country-specific needs and requirements. The experiences and the development of good practices are transferable and documented, allowing for use by other countries.

This new publication presents what has been learnt and achieved. It is hoped that this initiative is only the beginning of broader efforts, and that many more countries within and beyond the WHO European Region will follow and learn from the valuable results.



**Zsuzsanna Jakab**  
Regional Director  
WHO Regional Office for Europe



**Jürgen Becker**  
State Secretary  
Federal Ministry for the Environment,  
Nature Conservation and Nuclear Safety

## ACKNOWLEDGEMENTS

This initiative has involved several hundred people within all seven countries and at the intercountry coordination level. They deserve recognition as these results would not have been achieved without their hard work and dedication. Here we acknowledge the many significant contributions by highlighting the various groups of technical experts, decision-makers and stakeholders involved in this project.

We would like to thank our colleagues at the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) for their assistance in donor coordination and collaboration, and the International Climate Initiative (ICI) for providing financial support to this project.

A national steering committee in each country guided project implementation. Many thanks are due to all the members of these committees – for their role in establishing priorities and securing political support for the initiative; and in acting as a liaison between technical implementation and national governments to ensure that the resulting vulnerability assessments and strategies received appropriate recognition. In addition, many hundreds of technical experts contributed to the assessments and drafting of the final publications. Without this support it would not have been possible to achieve such detailed and thorough assessments of the impact of climate change, nor to develop such tailored health adaptation strategies for each of the seven countries. We are extremely grateful to all those involved at different stages of project development and implementation.

We also extend our appreciation to all the government ministries, national institutions and external stakeholders that supported and contributed to the project. Although too many organizations to mention by name, their contributions to the project, whether great or small, were essential for achieving the final outcomes.

Particular thanks go to the staff of the WHO country offices in Albania, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, the former Yugoslav Republic of Macedonia and Uzbekistan. Implementation of the project was coordinated by a national project officer in each of the country offices. They also served as a focal point between national collaborators and WHO technical staff. The staff of the WHO country offices and their colleagues were the constant driving force in the project: seeking out technical expertise where needed, and liaising between all the partners involved. We particularly acknowledge the spirit of collaboration between the national project officers which allowed sharing of experiences and lessons learnt.

Finally, thanks to the WHO Regional Office for Europe technical staff in Bonn and Copenhagen for their coordination oversight and expert contributions that led to significant capacity development in the project countries, with tangible results.

This publication reports the successes achieved over the past few years. These would not have been possible without the hard work of those acknowledged above.

*Climate Change, Green Health Services and Sustainable Development*  
WHO Regional Office for Europe

## SUMMARY OF RESULTS: AT A GLANCE

This publication presents the results of a pilot seven-country initiative of the WHO Regional Office for Europe aimed to protect health from climate change through addressing adaptation, strengthening health systems and building institutional capacity. The project was supported financially by the International Climate Initiative (ICI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

In 2008, the ICI selected seven WHO European Region countries, based on various criteria: climate-related exposures; severity of projected health effects; existing collaborative mechanisms between WHO and the national government; and eligibility for official development assistance (ODA). Their geographical and climatic features include arid and semi-arid water stressed areas (Uzbekistan, Kazakhstan); high mountainous areas (Tajikistan, Kyrgyzstan); Mediterranean countries (Albania, the former Yugoslav Republic of Macedonia); and a sub-Arctic region in the northern Russian Federation.

The overall aim of the pilot initiative was to protect health from climate change through strengthening health systems. It was planned to achieve this by building capacity in assessing vulnerability, impacts and adaptive capacity in each country. In turn, this would form the basis for developing a national health adaptation strategy or action plan; carrying out awareness raising activities; and facilitating the sharing of knowledge and experiences. In addition, pilot activities specific to each country aimed to address current climate change vulnerability. These included strengthening preparedness and response for extreme weather events; increasing surveillance and response for climate-sensitive infectious diseases; developing water safety plans; reducing the risk for respiratory diseases; fostering innovation in energy efficiency and use of renewable energy for health services; and air quality monitoring.

Some overarching success themes in the implementation approach highlight the innovative nature of the project and are outlined in the following paragraphs.

### Multisectoral approach

It is well understood that coherent multisectoral action is necessary if the challenges posed by climate change are to be tackled effectively. Hence, national implementation of the project was guided by multisectoral national steering committees. Appointed by the respective governments, the steering committees represented a broad spectrum of policy-makers and stakeholders. This method of fostering dialogue between the various sectors and government departments made it possible to achieve not only a broad scope in strategy development but also political commitment to implementation.

### Whole-of-society approach

Capacity development and outreach activities within the project were targeted at a very broad range of society: from training of medical professionals to awareness raising among the general public. As much as possible, a whole-of-society inclusive approach was sought in order to stimulate the creation of more resilient communities. Training programmes within the education systems were developed, young journalists were engaged to write informative articles on the health effects of climate change and village health committees were informed on actions for health. Policy-makers, civil society and the private sector were also involved in the outreach programme, often as project stakeholders.

### Creation of resilient health systems

As a result of climate change, health systems and services will need to prepare for gradual changes in outcomes, sudden extreme events (e.g. heat-waves, flooding, infectious disease outbreaks), increasing

burden of disease and potential new conditions. Although specific needs varied between the seven countries, they all undertook actions to strengthen preparedness, including: (a) strengthening primary health care; (b) building capacity in the workforce; (c) strengthening health security; (d) strengthening monitoring, surveillance and early warning; (e) assessing capacity, impacts and developments; and (f) strengthening energy security through renewable and clean-energy technologies to reduce hospitals' vulnerability to disruption in case of intermittent energy supply or natural disasters.

### Transferability of results

The methodology and tools developed throughout the initiative all have a solid basis in established published frameworks, but have been adapted to country-specific and health-specific needs. By illustrating how climate change adaptation and mitigation measures can be applied to the health sector, this seven-country initiative serves as a true pilot for further development and investment in the field. The processes and methods developed (e.g. performance of vulnerability assessments, strategy development) were transferred between the seven countries. Such proof of concept of transferability indicates that these lessons learnt can be used to stimulate the health adaptation process in other countries.

### Illustration of potential

The summarized results of the initiative are presented over the next few pages. Each of the seven national case studies illustrates very different political and climatic circumstances. Above all, this pilot initiative demonstrates the potential for action – the capacity for greater implementation of climate change adaptation and mitigation measures to protect health from climate change. By highlighting how much has been achieved it is hoped that the experiences reported here will serve as a positive stimulus for further action in the WHO European Region and beyond.



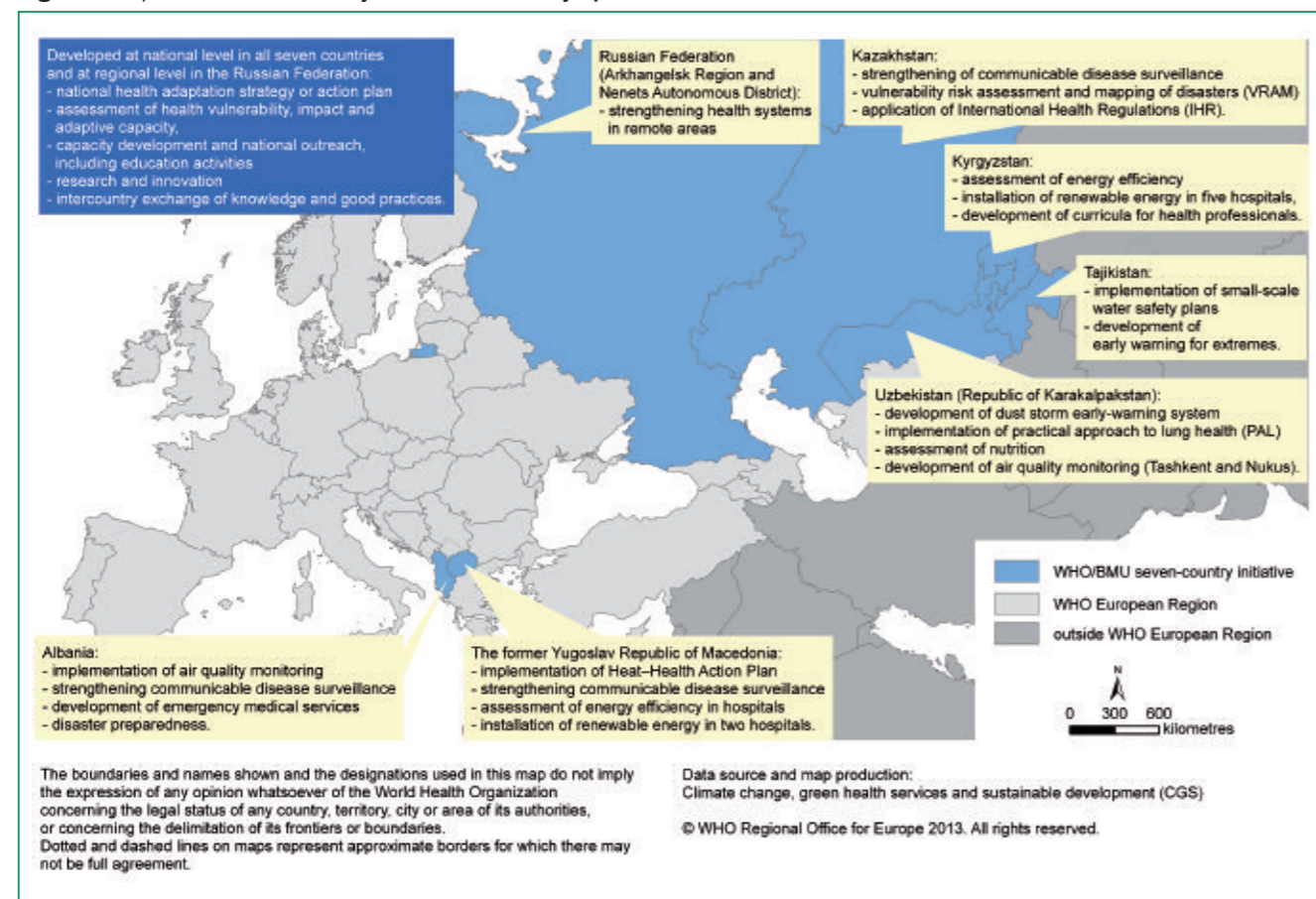
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## Introduction

The impacts of climate change are already being felt in the WHO European Region. Over many years, people throughout the arid and semi-arid water-stressed areas and high mountain areas of Central Asia have become grimly familiar with the increasing number of environmental emergencies caused by extreme phenomena such as floods and heat-waves, torrential rainstorms, hurricanes, droughts and hard winters. Human society is also feeling the pinch of climate change in the Arctic and sub-Arctic regions – retreating glaciers and melting permafrost are damaging health infrastructure and long-established transport routes. In the Mediterranean basin, extreme weather events (especially heat-waves) and changing distribution of infectious disease are presenting new climate-related risks.

In 2008, the WHO Regional Office for Europe started a pilot initiative aimed at protecting health from climate change. Supported by the BMU, the project was designed to identify and implement adaptation measures in seven pilot countries. The various common and country-specific activities are presented in Fig. 1.

Fig.1. WHO/BMU seven-country initiative: country-specific activities



The following core activities were carried out in all seven countries:

- development of national health adaptation strategy or action plan
- assessment of health vulnerability, impact and adaptive capacity
- capacity development and national outreach, including education activities
- research and innovation
- intercountry exchange of knowledge and good practices.

A number of specific activities were implemented by country, including:

- development of prevention, preparedness and response to extreme weather events
- strengthening of climate-sensitive disease surveillance
- improvement of air quality and reduction of respiratory disease burden
- development of water safety plans
- strengthening of food safety and security.

In addition, some countries identified development opportunities as well as potential for technical innovation. These included the development of energy efficiency and use of renewable energy for health services; development or expansion of early warning systems; and development of air quality monitoring in selected cities.

## Governance, stakeholder engagement and management

Governments in each of the seven pilot countries appointed a national steering committee to guide political and technical implementation. Each steering committee identified possible stakeholders (based on interest and influence) and developed a stakeholder engagement plan. Several dialogue workshops were organized in each of the countries.

Within the bilateral cooperative agreements, the WHO Regional Office for Europe coordinated implementation within the seven countries – sharing a common management structure (common logical framework); coordinating with an international appointed advisory committee; building capacity across disciplines; and enabling a mechanism of sharing experiences, methods and tools. A national project officer and assistant were appointed to provide logistical support to the steering committee, follow up day-to-day implementation and facilitate resource management.

Components common to all seven countries and some examples of key results of country-specific activities are presented in the following pages.



## COMMON ACTIVITIES

### Development of national health adaptation strategy or action plan

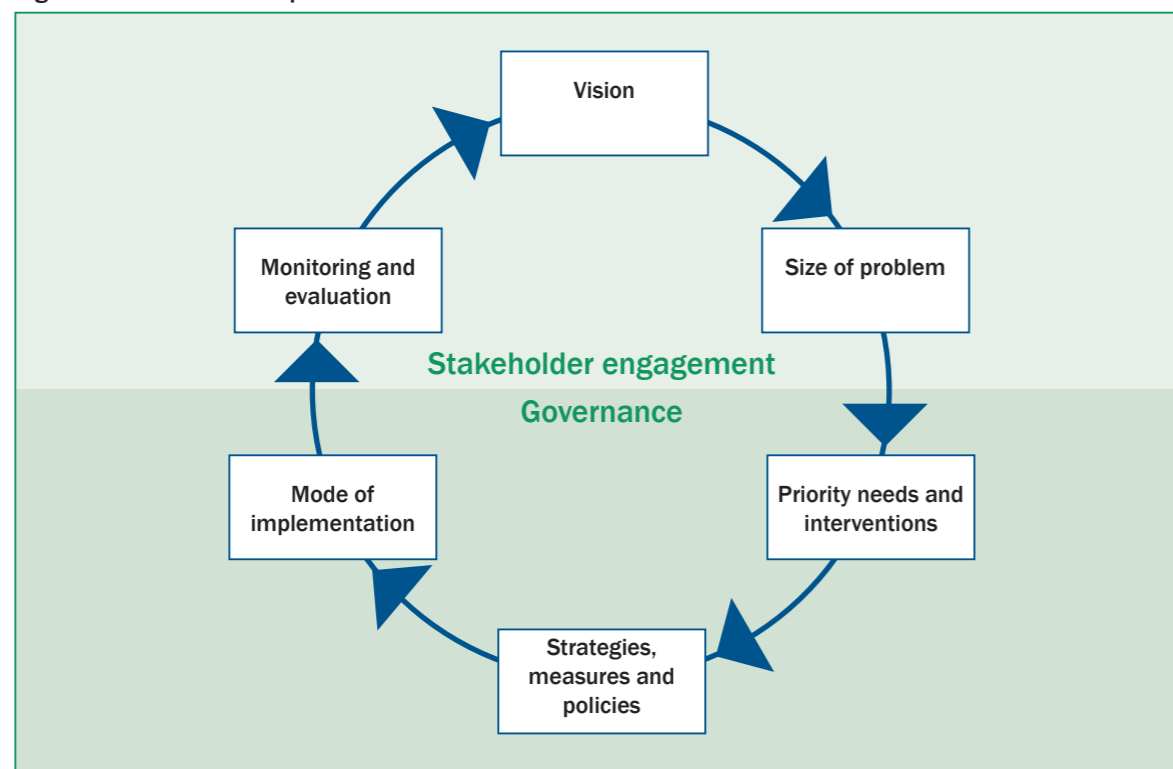
A national adaptation strategy or action plan is intended to reduce vulnerability to climate change and to facilitate integration of climate change adaptation into existing policies in a coherent manner.

At the commencement of the project some countries had plans to develop multisectoral national adaptation strategies, others had not discussed such a plan. The project contributed to formulation of the specific health protecting elements of adaptation in the former and development of national adaptation strategies, with a specific focus on human health, in the latter. Six of the seven countries developed national-level adaptation strategies or plans (four are government endorsed). In the Russian Federation, a regional strategy was developed for the Arkhangelsk Region and Nenets Autonomous District (endorsed by the regional government).

Development of the national/subnational health adaptation strategies/plans followed the guiding principles of the UNFCCC guidelines.<sup>1</sup> Hence, they were: (i) participatory, (ii) multidisciplinary (iii) contributing to sustainable development (iv) inclusive of the most vulnerable, (v) country driven, and (vi) built on sound evidence. Where possible, cost-effectiveness estimations were developed and the flexibility of procedures was considered.

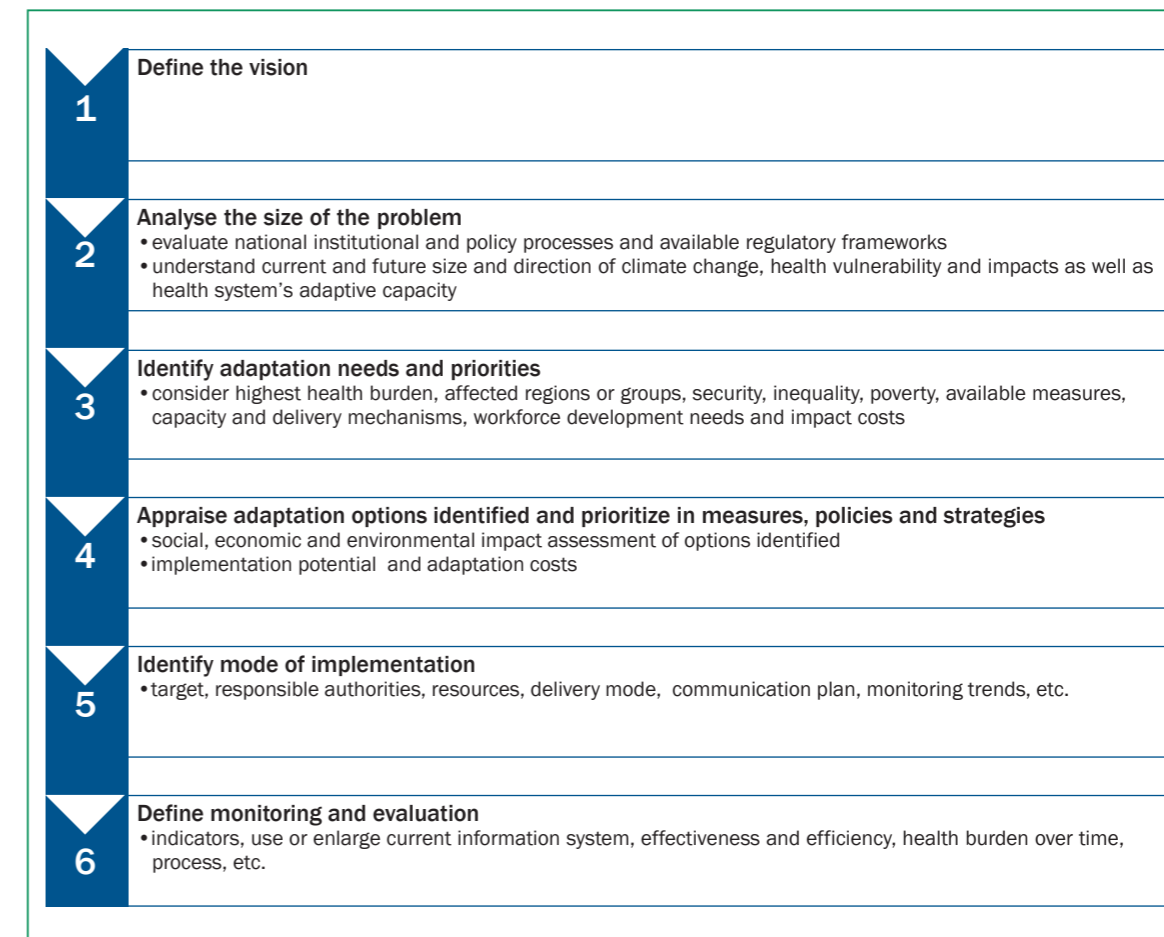
As no specific guidelines were available at the start of the project, the WHO Regional Office for Europe developed a public health framework (Fig. 2) and a stepwise approach (Fig. 3).

Fig. 2. Public health adaptation framework



<sup>1</sup> Least Developed Countries Expert Group (2012). *National Adaptation Plans. Technical guidelines for the national adaptation plan process*. Bonn, UNFCCC secretariat ([http://unfccc.int/files/adaptation/cancun\\_adaptation\\_framework/application/pdf/naptechguidelines\\_eng\\_high\\_res.pdf](http://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high_res.pdf), accessed 13 August 2013).

Fig. 3. Stepwise approach for developing a health adaptation strategy/action plan



For each step, guiding questions were debated within the national steering committee and amongst stakeholders. This approach is consistent with the UNFCCC guidelines<sup>2</sup> and reflects WHO's *European Regional Framework for Action*<sup>3</sup> and the World Health Assembly resolution on climate change and health.<sup>4</sup>

Health systems have been shown to be able to deal with existing problems, but need to strengthen capacity for both preventing and managing the health effects of climate change. A number of learning elements were identified across the seven countries.

These include, for example, the need for intersectoral action and cooperation (with each sector knowing their roles and responsibilities) and the need to strengthen public health services, build capacity, retrieve complex information, link various information systems and target individuals. Many countries have promoted sustainable development by using energy-saving technologies, with lessons learnt about their implementation available to other countries.

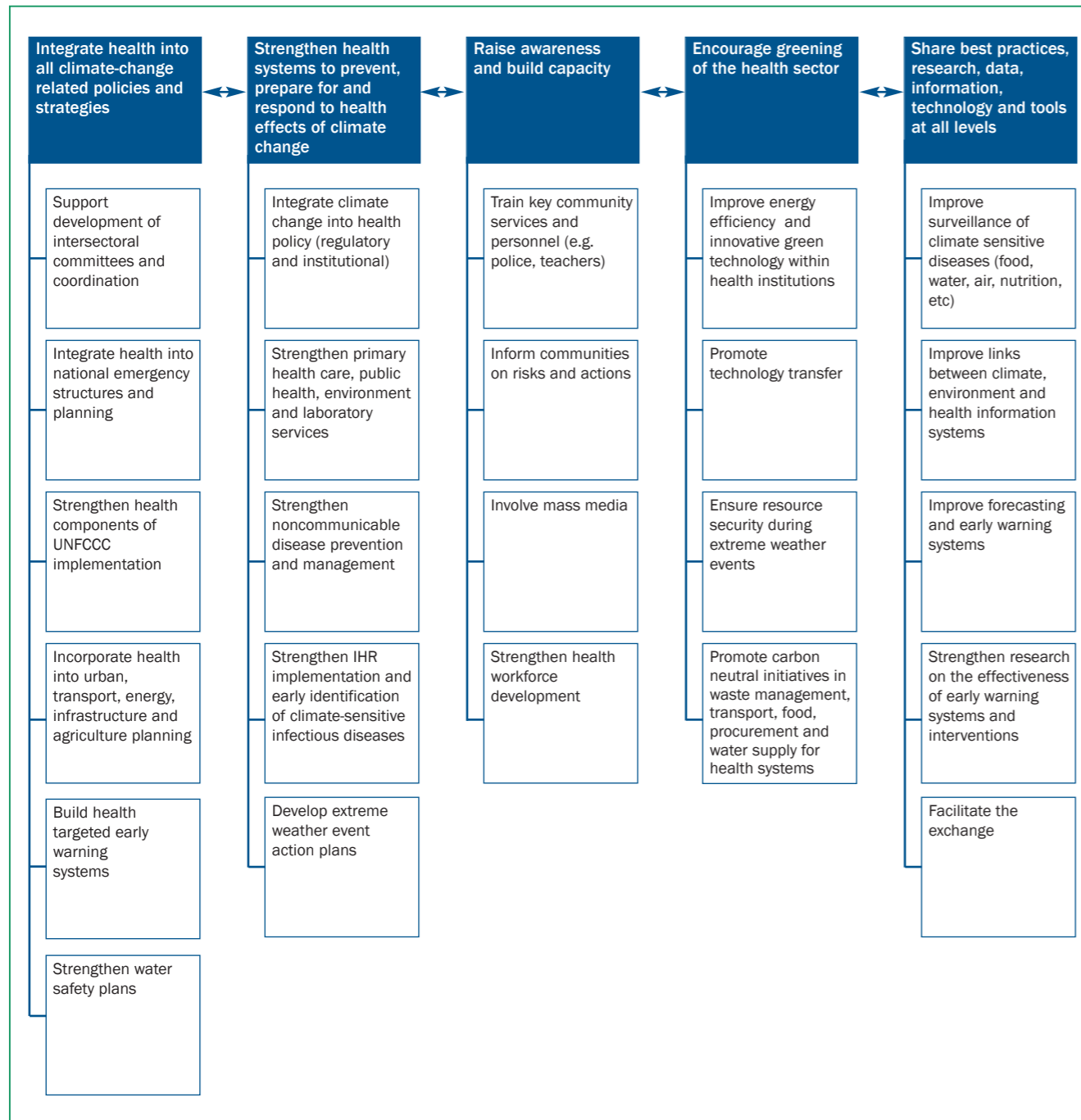
<sup>2</sup> Ibid.

<sup>3</sup> WHO Regional Office for Europe (2010). *Protecting health in an environment challenged by climate change: European Regional Framework for Action*. Copenhagen (<http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/Climate-change/publications/2010/protecting-health-in-an-environment-challenged-by-climate-change-european-regional-framework-for-action>, accessed 13 August 2013).

<sup>4</sup> WHO (2008). Resolution WHA61.19. Climate change and health. In: *Sixty-first World Health Assembly resolutions and decisions*. Geneva, World Health Organization: 26–28 ([http://apps.who.int/gb/or/e/e\\_wha61r1.html](http://apps.who.int/gb/or/e/e_wha61r1.html), accessed 13 August 2013).

Although each country elaborated its own adaptation strategy or action plan, five common elements were identified, consistent with WHO's European Regional Framework for Action.<sup>5</sup> Fig. 4 presents a summary of the strategies' common objectives. The five government-endorsed adaptation strategies (or plans) are monitored regularly; the remaining two are awaiting government approval. Overall, the projects have shown that it is possible to act now.<sup>6</sup>

Fig. 4. Common elements in health adaptation to climate change identified by the seven countries



<sup>5</sup> WHO Regional Office for Europe (2010). *Protecting health in an environment challenged by climate change: European Regional Framework for Action*. Copenhagen (<http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/Climate-change/publications/2010/protecting-health-in-an-environment-challenged-by-climate-change-european-regional-framework-for-action>, accessed 13 August 2013).

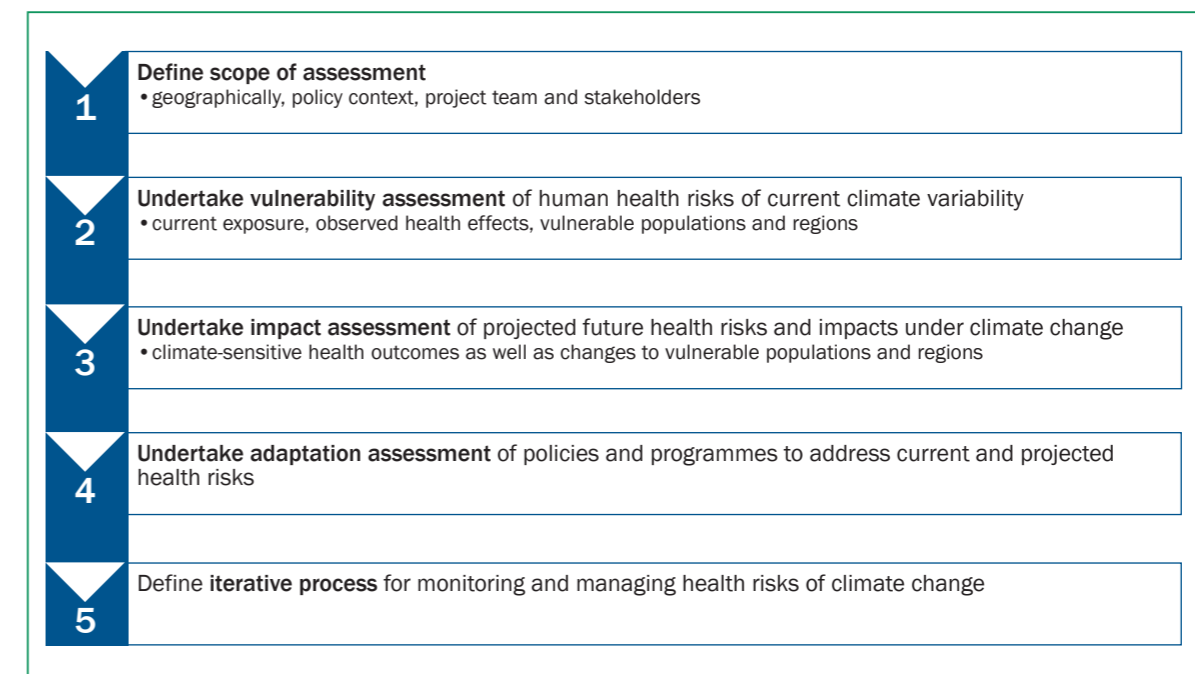
<sup>6</sup> WHO Regional Office for Europe (2012). *Climate change and health: lessons learnt in the WHO European Region. Meeting report, 4–6 June 2012*. Copenhagen (<http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/Climate-change/publications/2013/climate-change-and-health-lessons-learnt-in-the-who-european-region>, accessed 13 August 2013).

## Assessment of health vulnerability, impact and adaptive capacity

A technical and comprehensive assessment of vulnerabilities, impacts and adaptation options was undertaken in each of the seven countries. The aim was to identify not only the type, scale, nature and direction of climate change exposure and health risks, but also the adaptation measures currently in place. The data and information collected were used to establish the evidence base to define the scope of the national adaptation. Each national steering committee appointed a technical working group composed of scientists and professionals from national research institutions, public health organizations, universities and nongovernmental organizations.

The assessment of health vulnerability, impact and adaptive capacities used the methods developed by WHO and its partners in 2004 and 2012<sup>7,8</sup> (Fig. 5).

Fig. 5. Steps in a health vulnerability, impact and adaptive capacity assessment<sup>9</sup>



Each national steering committee identified major climate change exposures and risks by means of a stakeholders dialogue workshop. Their technical working groups identified readily available data and sources for assessing health risks and impacts. Qualitative and quantitative methods included literature reviews, expert judgement, time series and regression analysis and scenario-based assessment. A summary model of assessed climate change exposures and health impacts is presented in Fig. 6 with the components and overall results summarized in Table 1. Additional research was performed when necessary. A health damage and adaptation cost tool was developed and applied in one country.<sup>10</sup>

<sup>7</sup> Kovats S, Ebi KL, Menne B (2003). *Methods of assessing human health vulnerability and public health adaptation to climate change*. Copenhagen, WHO Regional Office for Europe (<http://www.euro.who.int/en/what-we-publish/abstracts/methods-of-assessing-human-health-vulnerability-and-public-health-adaptation-to-climate-change>, accessed 13 August 2013).

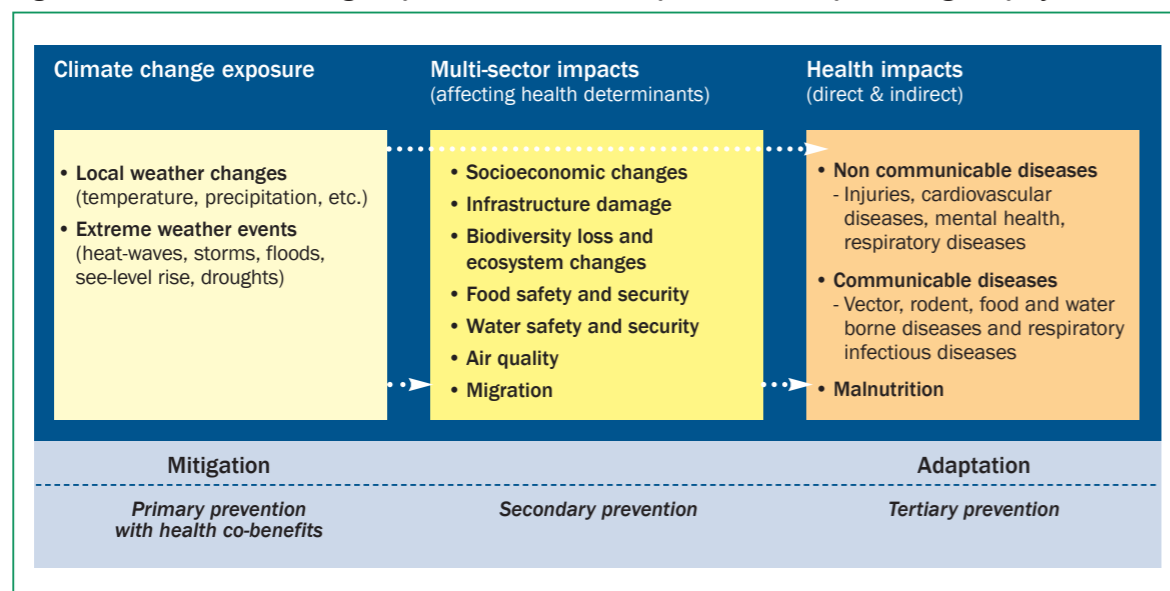
<sup>8</sup> Ebi K et al. (2012). *Protecting health from climate change – vulnerability and adaptation assessment*. Geneva, World Health Organization (<http://www.who.int/globalchange/resources/adaptationresources/en/index.html>, accessed 13 August 2013).

<sup>9</sup> Adapted from Kovats S, Ebi KL, Menne B (2003). *Methods of assessing human health vulnerability and public health adaptation to climate change*. Copenhagen, WHO Regional Office for Europe.

<sup>10</sup> WHO Regional Office for Europe (2013). *Climate change and health – a tool to estimate health and adaptation costs*. Copenhagen (<http://www.euro.who.int/en/what-we-publish/abstracts/climate-change-and-health-a-tool-to-estimate-health-and-adaptation-costs>, accessed 13 August 2013).



Fig. 6. Model of climate change exposures and health impacts as developed during the project



The major impacts assessed by the countries are summarized in Table 1.



Table 1. Components of the vulnerability assessment by country and observed trends

	Climate change exposures assessed				Health impacts assessed (direct and indirect)							
	Temperature change expected	Precipitation	Frequency and intensity of extreme weather events	Other social and environmental determinants of health	Cardiovascular diseases (heat-related)	Respiratory diseases (cold, heat and air pollution related)	Communicable diseases	Nutritional status	Mental health	Allergic diseases	Other	
Albania	↑	↓	Fires, drought, heatwaves, floods	Air quality, water safety/security, sea-level rise, coastal erosion	↑	↑	↑	(*)	(*)	(*)	Injuries	Albania
Kazakhstan	↑	↑	Floods, heatwaves, fires, droughts, extreme cold, wind storms, mudflows, landslides	Food security, water safety/security, air quality, waste management	↑	(*)	↑	(*)	↑	n/a	Injuries and drowning	Kazakhstan
Kyrgyzstan	↑	↓	Floods (also mudflows, landslides, storms, heatwaves, extreme cold)	Availability of arable land, food and water safety/security	↑	(*)	↑	(*)	(*)	n/a		Kyrgyzstan
Russian Federation (northern pilot region)	↑	↑	Floods, fire, windstorms, heatwaves, extreme cold	Air quality, food safety/security, water safety, coastal zones, ice thickness, permafrost retreat	↑	↑	↑	n/a	n/a	n/a	Injuries	Russian Federation (northern pilot region)
Tajikistan	↑	↑/↓	Drought, floods, heatwaves, extreme cold	Food and water safety/security	↑	↑	↑	(*)	n/a	n/a	Reproductive health	Tajikistan
The former Yugoslav Republic of Macedonia	↑	↓	Drought, fires, heatwaves, floods	UV exposure, water security, food/water safety, air pollution	↑	↑	↑	n/a	n/a	↑	Melanoma and other skin cancers	The former Yugoslav Republic of Macedonia
Uzbekistan	↑	↑/↓	Drought, floods, dust storms, heatwaves, extreme cold	Air quality, waste management, pollution, food and water safety/security	↑	↑	↑	(*)	n/a	↑	Endocrine disorders	Uzbekistan

Notes: ↑ = increase; ↓ = decrease; ↑/↓ = depends on region; (\*) = more research needed; n/a = not assessed

In many cases, the vulnerability assessments were the first of their type to be conducted in the country/region. The resulting wide range of information on epidemiology; social and environmental situations; and health system preparedness served as a solid evidence base on which to develop an adaptation policy and has raised awareness and stimulated further research and documentation within the national academic communities. They will continue to contribute to the iterative process of improving the analyses and further influencing future policy development.

## Capacity development and national outreach

Capacity development and outreach both form an integral part of the commitments made by the Member States of the WHO European Region at the Fifth Ministerial Conference on Environment and Health in 2010. They were also strongly interlinked throughout the implementation of the seven-country initiative.

Workshops involving a range of international experts were held in all seven countries. The aims were to enable participants to understand the basic elements of the adaptation strategy development; undertake vulnerability and impact assessment through quantitative and qualitative methods; and develop media messages. Where requested, training in epidemiological and statistical methods was carried out in cooperation with the medical faculties. The latter has led to a range of undergraduate and postgraduate degrees on the subject of climate change and health.

Basic capacity development in all seven countries aimed not only to strengthen mainstream public health and health services in general, but also to make them more resilient to climate change. This included development of the health workforce's knowledge of issues related to climate change and health. The WHO developed curricula for training the health workforce on prevention, early diagnosis and treatment of diseases related to climatic and meteorological factors; how water quality and food safety are affected; and how to strengthen emergency medical services, as well as intersectoral cooperation.

Training could be tailored to meet specific needs within a particular country/region. Vulnerability and risk analysis and mapping (VRAM) exercises for health facilities were developed in Kazakhstan. These helped to identify hospitals at high risk from extreme weather events and were reinforced by conduct of the public health emergency management (PHEM) course. The Hospital Safety Index was applied in the former Yugoslav Republic of Macedonia in order to identify vulnerable health services in particular.

Development of early warning and surveillance systems was also a major component of capacity development in the pilot countries, involving implementation of the International Health Regulations, training of laboratory specialists and increased laboratory capacity.

Information campaigns had to be tailored to each country and to each intended audience, taking account of marked cultural differences. Levels of Internet access and use, and the roles of the media, varied widely. Traditional media (specifically television) were used extensively in the Central Asian republics – television programmes, interviews and documentaries were produced. Young journalists in Kazakhstan were taught how to write effectively on issues relevant to environment and health. In Kyrgyzstan, media training was delivered to promote and facilitate education of the broader population and a communication working group was formed to develop and deliver a list of actions for health on climate change.

The Mediterranean countries of Albania and the former Yugoslav Republic of Macedonia made far more extensive use of Internet and other resources – for example, setting up project web sites and the Heat-Health Action Plan web site in Macedonia. A schools campaign was developed in Albania, incorporating a children's game and age-appropriate leaflets about climate change and health. The World Health Youth (WHY) Environment and Health Communication Network was involved in producing and delivering education materials, including a video. In addition, direct awareness-raising campaigns were run within communities in order to increase knowledge of hygiene and sanitation, safe nutrition, injury prevention and climate change impact.

## Research and innovation

The project introduced many innovative approaches and technologies into the pilot countries. It also served as a stimulus for research – most of these countries had previously undertaken very little research on the effects of climate change. The substantial impact assessments conducted have left a foundation of climate change impact research that forms a basis on which national and regional academic communities in each of the seven countries may build. A significant number of doctoral theses were subsequently written on the topic, thereby achieving another project objective – improving awareness of the effects of climate change, understanding of the health risks and provision of a more solid evidence base to guide future policy development.

Several tools were used and developed throughout the project. A disaster mapping tool was used to determine vulnerability to flooding in 99 health facilities in Kazakhstan, allowing the development of optimal emergency response plans. In addition, a manual on communicable diseases was developed in the former Yugoslav Republic of Macedonia to aid health professionals in the diagnosis, management and surveillance of selected infectious diseases that are expected to become a greater threat with climate change.

Technology transfer was a specific component in several countries. Air quality monitoring was established in the Albanian capital, Tirana, following the installation of monitoring equipment at two locations. In Uzbekistan, the country's first air quality monitoring system to meet international standards was installed (in Tashkent and Nukus). This serves to identify levels of air quality and also links with dust early warning.



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Five hospitals in Kyrgyzstan were fitted with solar energy technology – the country’s first effort to simultaneously increase energy resilience whilst reducing the health sector’s carbon footprint. The former Yugoslav Republic of Macedonia and Uzbekistan developed early warning systems and connected action plans for heat-waves and dust storms, respectively. These engage health services, local governments, media and the broader community in preparing for, and responding to, extreme weather events.

Energy efficiency and green health services were recurring themes throughout the project. In addition to the aforementioned Kyrgyzstan example, a review of energy efficiency and renewable energy sources in the former Yugoslav Republic of Macedonia’s health sector led to the development of a manual for health workers and hospital managers. A pilot study assessing energy efficiency in three hospitals in Albania facilitated recommendations on improvements and ongoing maintenance.

Uzbekistan undertook a different approach to the research component, looking into the impact of air pollution on respiratory health in the pilot region of Karakalpakstan and climate change’s likely impact on food security and nutrition in the Central Asian region.

Existing structures were used to facilitate and implement several aspects of the project. The International Health Regulations were used to develop communicable disease monitoring and control strategies in Tajikistan and Kazakhstan, and the WHO *Guidelines for Drinking-water Quality* were used to facilitate the development of water safety plans in Tajikistan. The WHO *Air Quality Guidelines for Europe* were used to develop the air quality programmes in Albania and Uzbekistan.

### Intercountry exchange of knowledge and good practices

One strength of this project was the information-sharing processes between all the countries involved. This enabled lessons to be learnt and shared and good practices to be developed at each step. Many of the difficulties faced in project implementation were common to many countries, enabling strategies for tackling these obstacles to be developed and shared. Furthermore, the structure of the vulnerability assessments and strategies could be jointly developed on the basis of WHO guidelines and tailored to meet each country’s more specific needs.

Throughout this initiative, annual coordination meetings were held with all the technical staff involved in project implementation across all seven countries. In addition, two meetings involved the heads of the national steering committees, as well as international experts who comprised a scientific advisory board to the seven-country initiative. An international scientific advisory group was established to advise on project developments.

A more detailed list of the knowledge-sharing and result-dissemination meetings and events is given in Box 1.

#### Box 1. International outreach

##### *UNFCCC, side events*

- 15th Session of the Conference of the Parties (COP15), Copenhagen, December 2009. The German Federal Government introduced the project at a side event. The Uzbekistan representative presented the project at the Central Asian countries meeting.
- 16th Session of the Conference of the Parties (COP16), Cancun, November 2010. Minister of Health of the former Yugoslav Republic of Macedonia made reference to the project during his speech to the high-level plenary. He also introduced project results at a WHO side event and press conference.
- 34th sessions of the Subsidiary Bodies (SBSTA & SBI), Bonn, June 2011. All seven countries presented their results at a WHO-organized side event, opened by the BMU.
- 36th sessions of the Subsidiary Bodies (SBSTA & SBI), Bonn, May 2012. The WHO Regional Office for Europe presented overall results at a side event with major donors.
- 37th Session of the Subsidiary Body (SBSTA), Bonn, November 2012. The WHO Regional Office for Europe presented major methods and tools developed during the project, to be shared across countries (e.g. economic damage and adaptation tool).

##### *World Health Assembly*

- 63rd World Health Assembly, Geneva, May 2010. Results mentioned by WHO Member States reporting on implementation of WHO resolution on climate change and health.
- 64th World Health Assembly, Geneva, May 2011. Results mentioned by WHO Member States reporting on implementation of WHO resolution on climate change and health.
- 66th World Health Assembly, Geneva, May 2013. Lithuanian Presidency highlighted results of activities in the European Region.

##### *WHO Regional Office for Europe Ministerial Conference on Environment and Health*

- 5th Ministerial Conference on Environment and Health, Parma, March 2010. Side event highlighting objectives of the project: Protecting health from climate change – a seven-country initiative.

##### *EU Water and Environment Cooperation Platform – Central Asia*

- Working Group on Environmental Governance and Climate Change, 2nd Meeting, Almaty, September 2012. Presentation of project’s results in Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan).

##### *European Member States*

- WHO meeting: Climate change and health: lessons learnt in the WHO European Region, Bonn, June 2012. Presentation of results of the seven-country initiative, 31 Member States and 6 international organizations participated.

# PILOT COUNTRIES

## Albania

Located in the Mediterranean region, Albania has a climate characterized by hot dry summers and mild wet winters. Its diverse geography includes mountainous, lowland and coastal regions – the Adriatic Sea forms the western border. Albania has a population of about 3.2 million people, 42% of whom live in urban areas. A relatively high proportion of the population are young people aged 0–14 years (23.4%). Albania ratified the UNFCCC in 1994 and the Kyoto Protocol in 2005.

The vulnerability, impact and adaptation assessment performed in Albania was finalized in May 2011. The *Albanian Strategy for Health System Adaptation into the Climate Change* was adopted by the Minister of Health in October 2011.

### Activities specific to the project in Albania

#### Innovation: air pollution and air quality monitoring

Approximately 200 deaths per year are currently associated with air pollution in Tirana, the capital city. The project supported the establishment of an air quality monitoring system in Tirana through the purchase, installation and activation of two air pollution monitors. The data collected contribute to WHO information platforms through the sharing of tools, results and lessons learnt. The success of this programme prompted the European Commission to further extend the Albanian monitoring system by providing funding for four additional sets of equipment to be located in other regions. Local capacities for an air quality alert communication mechanism for the population of Tirana have been developed and WHO experts have trained a considerable number of professionals.

#### Innovation: improving energy efficiency in Albanian health-care facilities

A pilot study conducted in three hospitals allowed assessment of their energy efficiency. Recommendations were made regarding necessary improvements and maintenance requirements and plans developed for further investment in hospital infrastructure.

#### Capacity development: medical management of health emergencies due to extreme weather events

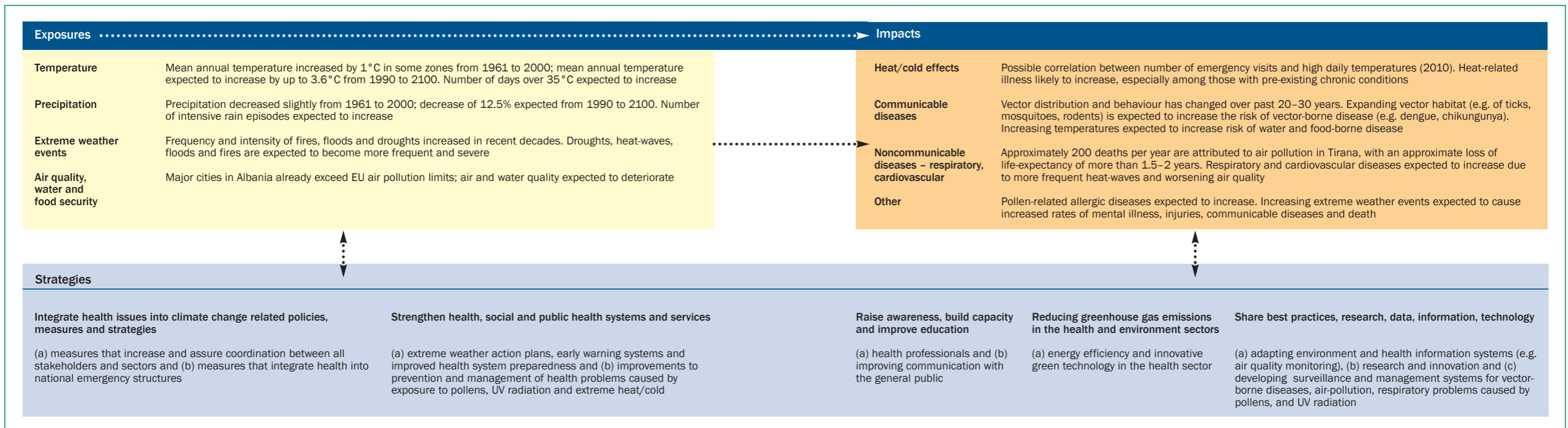
The project allowed the delivery of training on health emergency management during extreme weather events – a first for Albania. The training equipped 173 hospital and primary care doctors and nurses from 12 of Albania’s 36 districts to manage the health crises and consequences of extreme weather events by identifying and treating patients early to avoid deaths and severe health problems related to heat-waves, floods, air pollution and infectious diseases. They were also trained in the use of tools to facilitate early and accurate decisions on diagnosis and treatment. An important component of this programme was support for preparedness and response to emergency situations, ranging from improved capacity within the Ministry of Health to the preparation of hospital contingency plans and rapid assessment protocols.

#### Capacity development: educating the community about the health effects of climate change

Children and young people were identified as key target audiences for the delivery of community education in Albania. University students were taught about the links between climate change and health; school campaigns were initiated to teach children about climate change. Child-friendly information leaflets and an interactive game were produced and distributed, and an award for school-children (Environmentally-friendly Tirana) was launched.



Fig. 7. Exposures, impacts and strategic actions in Albania



## Kazakhstan

Kazakhstan is the ninth largest country in the world, occupying 1.8% of the earth's land territory. Located in the northern and central parts of Eurasia, it has a population of about 16 million people. Kazakhstan's arid and semi-arid climate is characterized by high summer and low winter temperatures, as well as sharp daily and annual temperature differentials. Kazakhstan ratified the UNFCCC in 1995 and the Kyoto Protocol in 2009.

The vulnerability, impact and adaptation assessment performed in Kazakhstan was published in March 2012. The national action plan was endorsed and adopted by the Ministry of Health in September 2012.



### Activities specific to the project in Kazakhstan

#### Awareness-raising

Kazakhstan introduced an extensive programme aimed at raising awareness of climate change and health. Information and education materials were developed and distributed to health managers and the general population, including 5000 flyers, 300 wall and desk calendars, 250 environmentally-friendly bags, banners and newsletters. Two press conferences were conducted and two documentaries about climate change were broadcast on national television. In addition, about 1060 people were trained on climate-related problems (including infectious disease control and disaster preparedness) at a series of meetings and workshops at subregional, national and subnational levels. A post-training evaluation of the level of awareness estimated a 25–30% average increase on the pre-

training assessment level. Young journalists received training to improve their skills in writing about environment and health issues, with the aim of improving education delivery to the broader community.

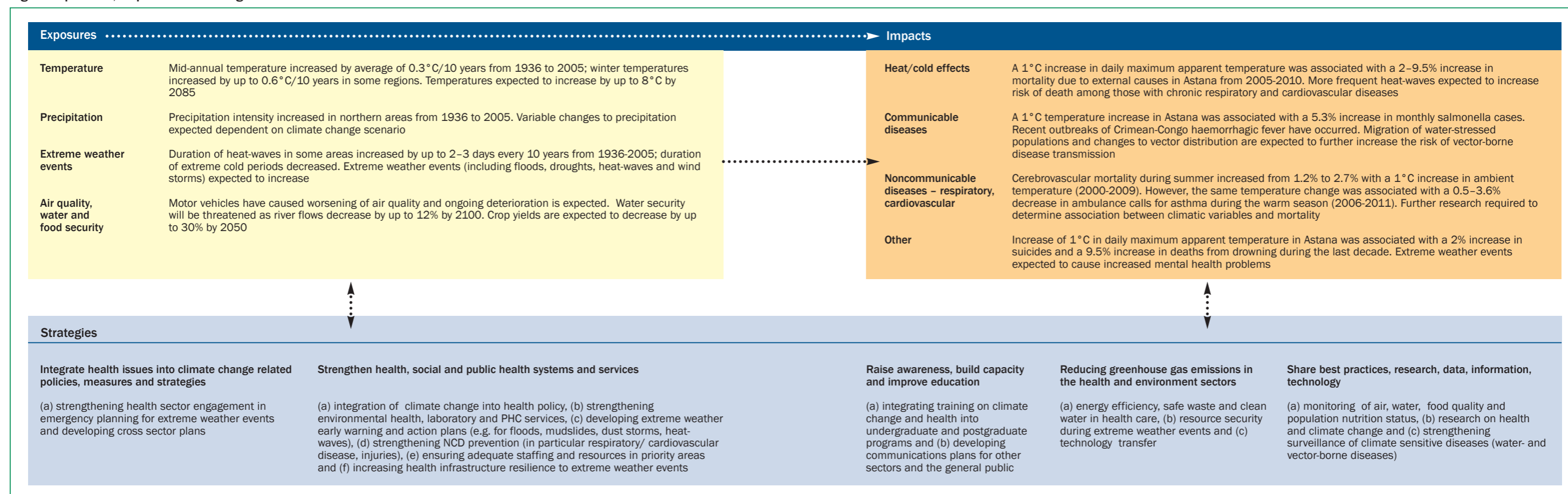
#### Capacity development: infectious disease monitoring

An outbreak of Crimean-Congo haemorrhagic fever (CCHF) in the south of the country in 2009 illustrated the weaknesses in infectious disease management and control in Kazakhstan. A WHO analysis revealed poor infectious disease information systems with limited and fragmented capacity to assess risk, perform diagnoses and prevent human disease. As a result, a two-day workshop designed to train health-care specialists in disease identification and treatment was held in Almaty in September 2009. This was attended by 60 public health professionals, epidemiologists, laboratory specialists and zoologists from across the country. In addition, 50 laboratory workers from all 14 regions of Kazakhstan were trained in identification of viral infections using polymerase chain reaction (PCR) techniques, and regional laboratories were provided with equipment to ensure early and correct diagnosis of infectious diseases. The state programme of health-care development, *Salamatty Kazakhstan*, has allocated funds to establish a 24-hour anti-epidemic headquarters.

#### Capacity development: vulnerability risk assessment and disaster mapping

An analysis of the Kazakh health system's capacity to manage emergencies allowed identification of key obstacles and strategies to improve both the detection of risks and emergency management. The VRAM programme was implemented in order to assess, visualize and analyse potential hazards and vulnerabilities, as well as existing response capacities. This comprehensive disaster risk analysis served as a basis for identifying and closing gaps in risk reduction measures and emergency preparedness planning. In particular, a risk analysis exercise was undertaken in East Kazakhstan Region in 2010–2011 to indicate vulnerability to floods among 99 health facilities. This activity has allowed emergency response planning through close collaboration between local health and emergency management services and their respective government ministries.

Fig. 8. Exposures, impacts and strategic actions in Kazakhstan



## Kyrgyzstan

Kyrgyzstan is located in north-east Central Asia. As almost 90% of the land area is more than 1500 metres above sea level, it lies in a high mountainous climatic zone. Kyrgyzstan has a population of about 5 million people, living predominantly in the foothills and valley regions. It is one of the poorest countries in the WHO European Region. The country ratified the UNFCCC in 2000 and the Kyoto Protocol in 2005.

The *Programme of the Health Sector of the Kyrgyz Republic on Climate Change Adaptation for 2011–2015* was authorized by the Ministry of Health in October 2011. The Ministry approved the final version of the vulnerability, impact and adaptation assessment of the Kyrgyz Republic in November 2011.

### Activities specific to the project in Kyrgyzstan

#### **Innovation: energy efficiency and use of renewable energy in the health sector**

Insufficient energy supply is a problem for many sectors in Kyrgyzstan, including health. Health-care facilities in Kyrgyzstan often suffer from intermittent power supply owing to issues with energy production and distribution, as well as an inadequate and ageing energy infrastructure. This can disturb the function of medical equipment and disrupt vital health-care services. Promoting the use of renewable energy sources and energy-saving technologies in the health sector is sustainable and supports both climate change mitigation and adaptation.

Five pilot hospitals were selected across a range of climatic zones and altitudes to allow an assessment of the effectiveness of renewable energy sources for health-care facilities in Kyrgyzstan. Energy-efficiency assessments were performed at each hospital by a working group from the Kyrgyz-Russian Slavic University with technical assistance from the WHO Country Office. Their results showed significant capacity for the application of renewable energy sources in the public health sector. A solar hot water

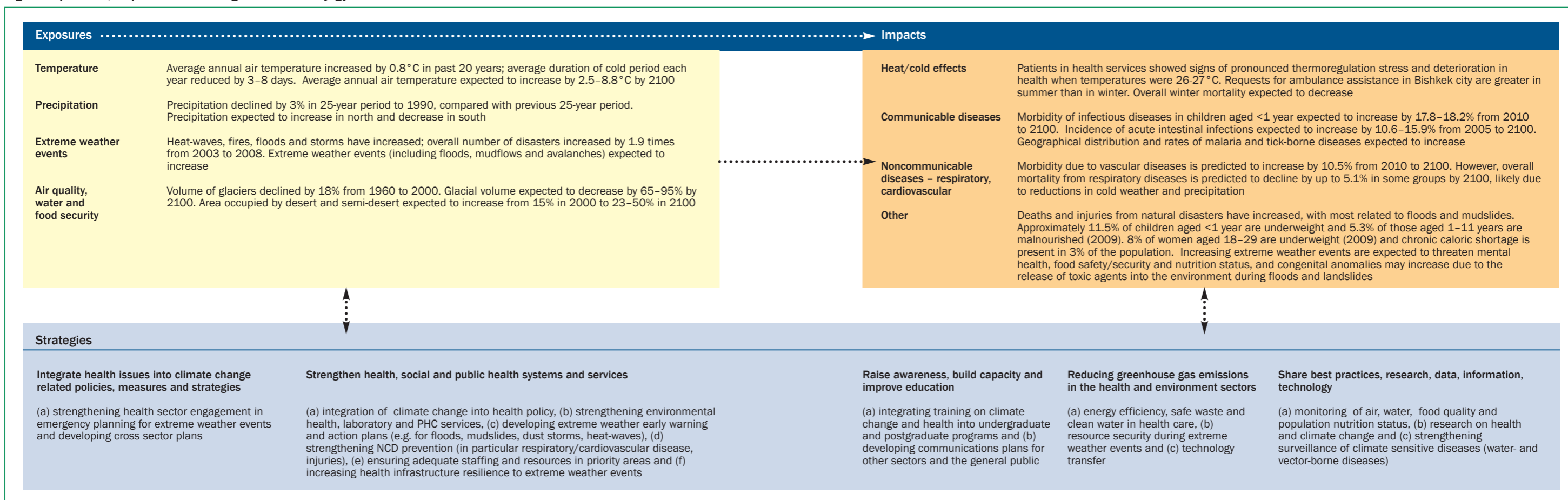


heating unit was established in Jaiyl Territorial Hospital; solar photovoltaic power plants were established to generate electric power at the four other hospitals. The pilot has shown the feasibility of adapting solar technology to the needs of the health-care sector and has facilitated the delivery of quality medical services. It should be noted that this is the first large-scale implementation of renewable energy sources in the public health sector in Kyrgyzstan. The results may be used as a starting point for the introduction of renewable energy sources for other health-care organizations and facilities.

#### **Awareness raising: outreach using village health committees**

This project involved a communication working group which developed a list of actions for health on climate change. These actions were implemented through a cascade system of training for specialists in health promotion at national, regional and local levels in Kyrgyzstan. The trained specialists then conducted activities among the general population and other target groups, using communication tools and materials. Brochures and posters supplemented traditional publications, and the message was reinforced through an educational video as well as television and radio programmes. Journalists were engaged to actively encourage media involvement.

Fig. 9. Exposures, impacts and strategic actions in Kyrgyzstan



## Russian Federation

Within the Russian Federation, the seven-country initiative was implemented in the Arkhangelsk Region and Nenets Autonomous District. This area is located in the north-west of the Russian Federation, about 1290 km from Moscow, and covers both Arctic and sub-Arctic climatic zones. Totalling about 1.3 million people, inhabitants of the Arkhangelsk Region and Nenets Autonomous District are particularly vulnerable to the effects of climate change due to their isolation and the extreme natural environment. The Russian Federation ratified the UNFCCC in 1994 and the Kyoto Protocol in 2004.

The vulnerability assessment of climate change health impacts was completed and submitted in December 2011. The *Strategy for Adaptation to Climate Change Impacts on the Population's Health in the Arkhangelsk Region and Nenets Autonomous District of the Russian Federation* was finalized in June 2012.

### Activities specific to the project in the Russian Federation

#### Capacity building: strengthening health systems in remote areas

Capacity building and resource assurance are key priorities for improving adaptation abilities to the effects of climate change among local health systems and populations in the Arkhangelsk Region and Nenets Autonomous District.

#### Innovation: strengthening health systems in remote areas

In order to facilitate communicable disease surveillance and control, laboratory equipment for the detection of tick-borne encephalitis was procured and installed in the regional laboratory. To improve the management of noncommunicable diseases, 24 kits for screening and monitoring of cardiovascular and

respiratory diseases were supplied to district hospitals within the pilot region. Six rural medical establishments were supplied with equipment for gynaecological examinations in order to promote improvements in reproductive health. In addition, an automated computer system was installed in the Arkhangelsk Region to improve the monitoring and analysis of disease incidence, referrals to health services, and disease mortality rates. This information will allow evidence-based responses to the health effects of climate change, including extreme weather events; heat and cold-waves; and infectious disease outbreaks.

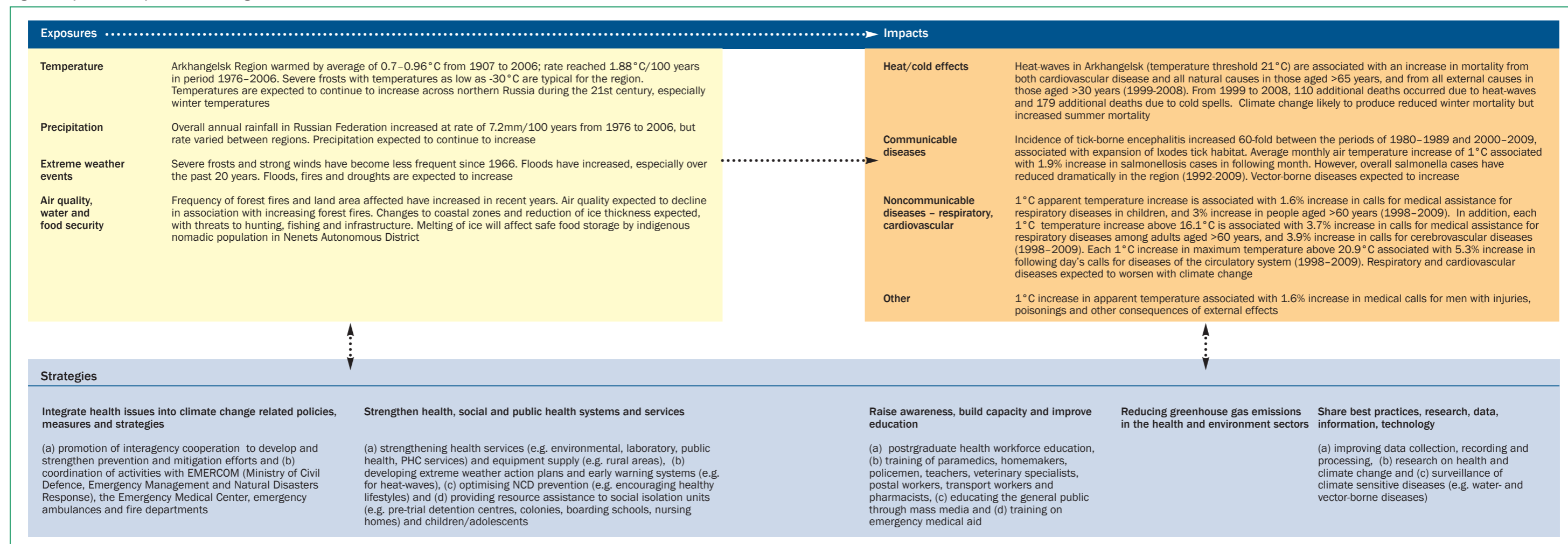
#### Awareness raising

In the Arkhangelsk Region and Nenets Autonomous District, numerous activities were performed to raise awareness about climate change risks to health. Education materials were delivered to general practitioners and the general public. The mass media was also instrumental in awareness raising, via newsletters, internet sites and television and radio programmes. Two workshops were held for 40 senior doctors in the Arkhangelsk Region, aimed at increasing awareness of the health impacts of climate change and facilitating implementation of adaptation methods within the health system. Training on the use of statistical methods for epidemiological assessment of health and vulnerability to climate change was delivered to 28 health workers. Postgraduate training courses were conducted for a total of 278 nurses, doctors and doctors' assistants.

The vulnerability assessment and project activities undertaken in the Arkhangelsk Region and Nenets Autonomous District are expected to serve as a basis for other strategies and activities in the country.



Fig. 10. Exposures, impacts and strategic actions in the Russian Federation



## Tajikistan

Tajikistan is a landlocked country located in a high mountainous area of Central Asia – 93% of its land area is mountainous; glaciers occupy a further 6%. The country has an arid climate, subject to extremes of temperature (hot and cold), and is prone to natural disasters including mudflows, landslides, avalanches and earthquakes. One of the poorest countries in the world, Tajikistan has a population of about 8 million people. Tajikistan ratified the UNFCCC in 1998 and the Kyoto Protocol in 2009.

The vulnerability, impact and adaptation assessment performed in Tajikistan was finalized in 2011. The *National Climate Change Health Adaptation Strategy and Action Plan 2011–2020* was developed in March 2012 and has been submitted for governmental and parliamentary ratification.

### Activities specific to the project in Tajikistan

#### Innovation: small-scale water safety plans

Only 55% of the population in Tajikistan have access to clean drinking-water and only 20% of health-care facilities have adequate safe running water. As recommended by the WHO's *Guidelines for Drinking-water Quality*, water safety plans are the most effective way to ensure the provision of safe drinking-water in small water systems. To support resilience and the provision of health care in Tajikistan, water safety plans were developed in two pilot village communities: Qaragoch in Hamadoni District and Navobod in Panjakent District. In addition, Rudaki Central District Hospital received support for renovation of its water supply system and implementation of a water safety plan.

Navobod sources drinking-water from a spring. During summer, this supply is supplemented by a nearby river but this is vulnerable to contamination and the associated risk of water-borne disease. In

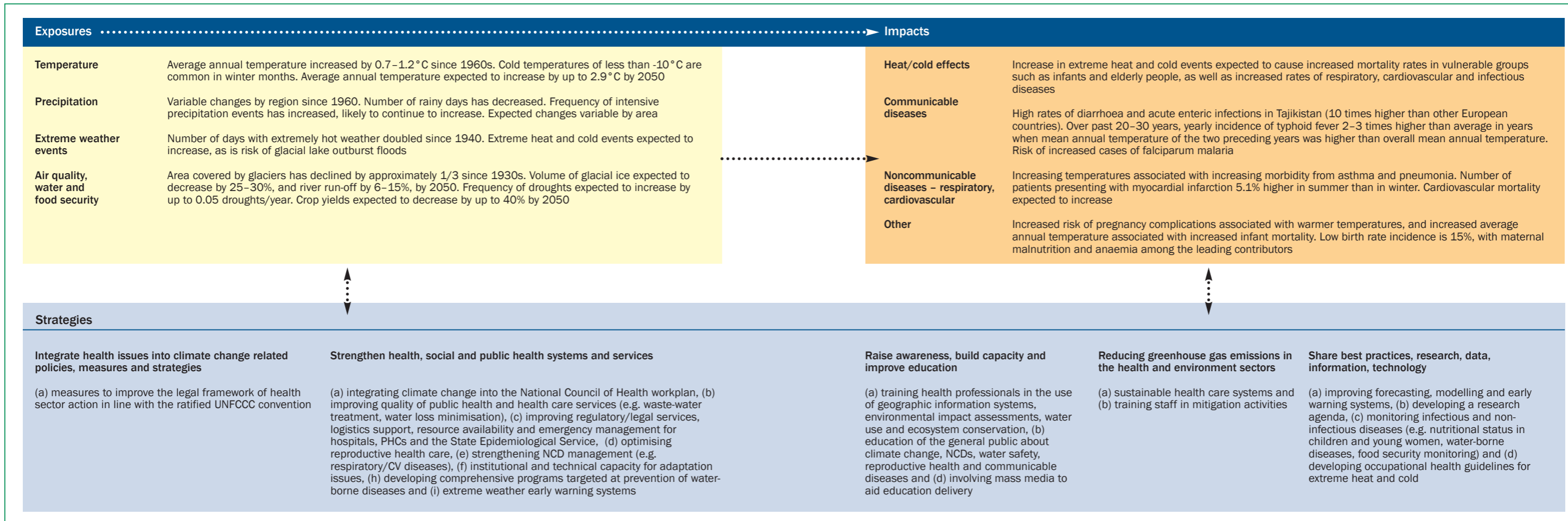
collaboration with the local water management board, members of the Navobod community commenced the water safety plan programme in 2011. A careful assessment of the water supply system identified potential risks and areas for improvement: sources of contamination and losses from the water distribution system were minimized; a chlorine-based water treatment unit was established; and plans for a sand filter developed. In Qaragoch, a water safety plan team involving residents assessed of the local water supply and found that the springs were inadequately protected from animals and that water containers were kept in an unsanitary condition. In addition, there were few community members skilled in the development and maintenance of water supply infrastructure. The team constructed fences to protect the springs from animals and a new water storage tank was built. Education about hygienic water collection and storage was delivered to the community. The initiatives delivered in Navobod and Qaragoch were complemented by training on water safety planning, including a workshop for facilitators and professionals in each village. To further raise awareness of water safety and security, the project held a national seminar which was attended by 40 decision-makers and potential donors.



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Serving a population of 340 000, Rudaki Central District Hospital has a new additional water pump providing 2410 people from surrounding villages with constant access to drinking-water. In addition, 52 washbasins and siphons have been replaced inside the hospital and Ministry of Health plumbers will be trained in aspects of basic plumbing and sanitation.

Fig. 11. Exposures, impacts and strategic actions in Tajikistan





## The former Yugoslav Republic of Macedonia

The former Yugoslav Republic of Macedonia is a landlocked country located in the central Balkan Peninsula in south-east Europe. Lying in the Mediterranean climatic zone, it has a population of about 2 million people. The former Yugoslav Republic of Macedonia ratified the UNFCCC in 1998 and the Kyoto Protocol in 2004.

The national vulnerability, impact and adaptation assessment was finalized in March 2011. The *Climate Change Health Adaptation Strategy and the Heat-Health Action Plan* were adopted by the Government of the former Yugoslav Republic of Macedonia in February 2011. The documents received further evaluation from November to December 2012.

### Activities specific to the project in the former Yugoslav Republic of Macedonia

#### Innovation: Energy Efficiency and Renewable Energy Sources in the Health Sector

Acknowledging the high energy requirements of the health-care industry, this manual was developed to raise awareness and knowledge of the importance of energy efficiency and the use of renewable energy sources. Targeted at health workers and managers at local, regional and national levels, the manual describes methods for achieving energy efficiency in health-care settings, including the use of insulation and energy-efficient lighting, heating, air conditioning and electrical appliances. It also provides a short overview of renewable energy sources and their possible uses, including solar, geothermal, biomass and wind energy.

#### Capacity building: Heat-Health Action Plan

Heat-waves are expected to increase in frequency and intensity in the former Yugoslav Republic of Macedonia. Residents of cities are at particular risk of temperature increases due to the urban heat island effect. The *Heat-Health Action Plan* was designed to facilitate early warning of heat-waves to public health and other institutions, allowing appropriate preventive measures to be initiated. It guides the issue of

heat-health warnings, especially to those most vulnerable, and outlines a four-phase heat-wave action plan. The Plan also aims to raise awareness of the health effects of heat-waves among health workers and the general public. Designed for multisectoral action, the aim is to facilitate timely coordination of resources and strategies in response to heat-waves, with the involvement of the health, transport, education, science, hydrometeorological, emergency management and nongovernmental sectors.

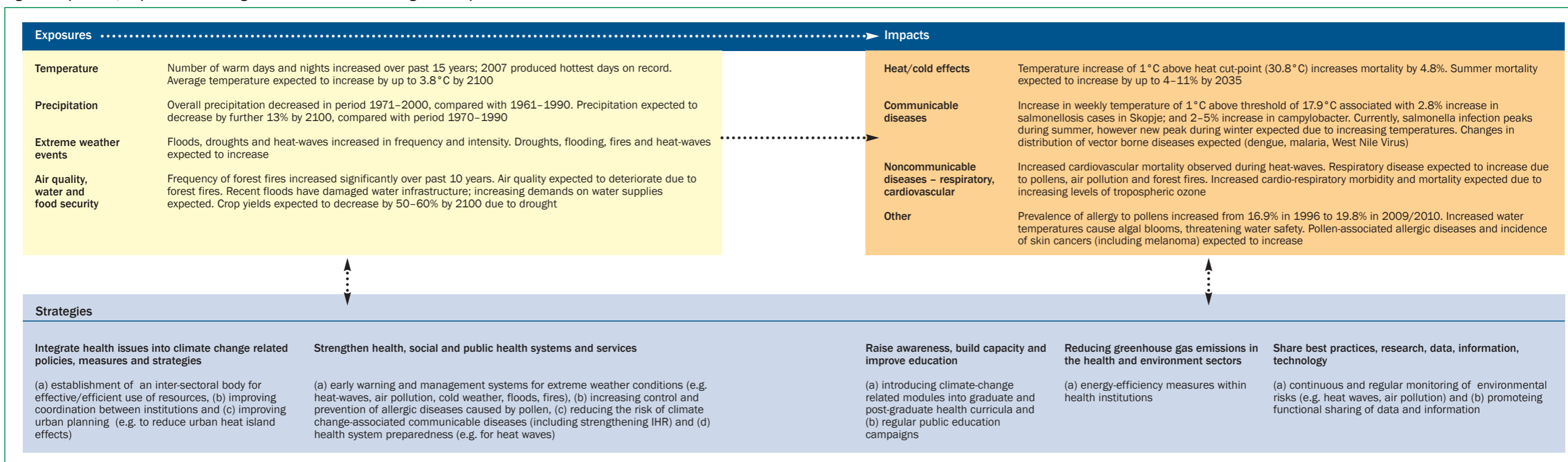


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#### Awareness raising: Climate Change and Communicable Diseases

This manual was developed to increase knowledge of the links between climate change and communicable disease. Targeted at health professionals at local, regional and national levels, the manual highlights current and emerging infectious disease risks in the former Yugoslav Republic of Macedonia, including food-, water- and vector-borne disease. It also describes the epidemiology, clinical features, diagnosis, treatment, prevention and surveillance of selected infectious diseases including salmonellosis, leishmaniasis, leptospirosis and Lyme borreliosis. The manual outlines the adaptation and preventive measures necessary to mitigate the risks associated with climate change and communicable diseases with the aim of minimizing their incidence. It also describes infectious diseases that may pose future threats to the country, including chikungunya, cryptosporidiosis and West Nile fever.

Fig. 12. Exposures, impacts and strategic actions in the former Yugoslav Republic of Macedonia



## Uzbekistan

Uzbekistan is located in the centre of the Eurasian continent and lies within arid and semi-arid climatic zones; 21% of the country is mountainous. Its climate is characterized by sharp variations in day-to-night and winter-to-summer temperatures. Most of the project's activities were conducted in Karakalpakstan, a sovereign republic within Uzbekistan, with a population of about 1.7 million people. Uzbekistan ratified the UNFCCC in 1993 and the Kyoto Protocol in 1999.

The vulnerability, impact and adaptation assessment performed in Uzbekistan was published in October 2011. The *Climate Change Adaptation Strategy of the Health Care Sector in the Republic of Uzbekistan* was completed in November 2011 and submitted for government approval.



### Activities specific to the project in Uzbekistan

#### **Innovation: air pollution monitoring in Tashkent and Nukus**

The original aim of the project was assessment of respiratory disease impacts from climate change and from dust storms. The absence of air quality monitoring to international standards was addressed by equipping two air quality monitoring stations. The location, function, efficiency and accuracy of the stations were developed and station staff received training in order to improve data processing. Technical assistance was provided for the development of standard operating procedures and quality assurance

methods. Numerous seminars and consultations about dust storms, air quality monitoring and data processing were held with local professional and technical staff.

#### **Innovation: pilot dust storm early warning system**

Dust storms are a frequent occurrence in the arid semi-desert areas of Uzbekistan, particularly in the Karakalpakstan region around the Aral Sea. The dust storm early warning plan for Karakalpakstan was developed with the aim of enhancing resilience and raising public and professional awareness of dust storms.

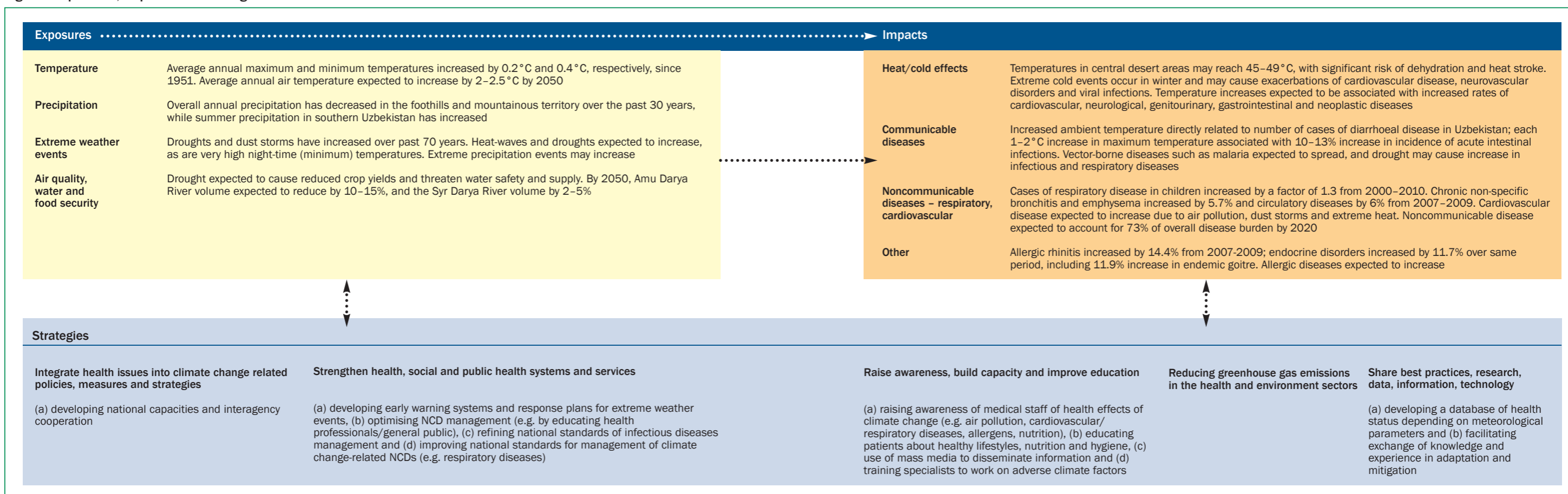
#### **Capacity development: practical approach to lung health (PAL)**

Extreme heat events and dust storms exacerbate respiratory diseases. Tuberculosis, asthma, chronic obstructive pulmonary disease and acute respiratory infections are of particular concern in Uzbekistan. The practical approach to lung health (PAL) uses a syndromic approach to the management of patients attending primary health care services and is designed to coordinate with tuberculosis control strategies. The progress of the PAL working group in the Karakalpakstan region was assessed during this project, thereby enabling updates to national guidelines and the provision of training materials. The project also served to strengthen political commitment to respiratory health care in the region.

#### **Assessment: Climate Change and its Impact on Food and Nutrition Security**

This activity was established to develop a national action plan to address the impact of climate change on food and nutrition in Uzbekistan. Conducted in the Karakalpakstan region, it was designed to assess food availability, household food consumption patterns and the nutritional status of women and children in the context of climate change. Several priority areas for action were identified, including the need to: strengthen the role and capacity of local organizations in adapting to climate change; develop sustainable and resilient agricultural, water supply and land management systems; develop and support emergency response strategies to food shortages arising; establish a nutrition surveillance system; strengthen the primary health care sector; and implement food-based interventions to prevent anaemia and other consequences of malnutrition.

Fig. 13. Exposures, impacts and strategic actions in Uzbekistan



The innovative nature of this pilot seven-country initiative served as a stimulus for institutional learning at multiple levels within each of the countries. This has been fundamental to increasing adaptive capacity and management. An increased focus on learning, modelling and adaptation will help to increase the resilience of local public health systems. By building integrated, efficient and effective approaches for prevention, preparedness and early warning; emergency management; and response to the health consequences of climate change, all seven countries are making significant strides towards developing adaptive capacity to improve climate resilience. Building of adaptive capacity remains an ongoing concern but many of the successes of this project have already begun to have an impact.

A significant international evidence base shows that adaptation requires a new level of cross-sectoral planning. Other sectors are increasingly acknowledging the need to incorporate health and vice versa. A number of tools utilized throughout the project allow practitioners to organize information on hazards and populations at risk in order to prioritize responses. These successes provide a robust and ongoing foundation for future collaboration and activity. The project has also shown that public health institutions at all operational scales will need to modify their approaches to both science and practice in anticipation of climate change health impacts. Alongside specific project benefits (e.g. increasing health professionals' awareness of the health impacts of climate change), the broader benefit has been increased engagement of key stakeholders and policy-makers with a climate change and health agenda. Before the process was initiated, the topic was largely marginalized.

A number of learning elements were identified across the seven countries: for example, the need to strengthen public health and its services; the importance of capacity building; and how best to integrate health within intersectoral action. Simple advice and methodologies were developed for many of these developments and can now be shared across countries.

Many of the country-specific activities are rooted in sustainable development and have used energy-saving technologies that could, and should, be used more widely and proactively. Overall, the country projects have shown the importance of acting now. They show clearly the breadth of what has, and what can, be achieved in a small timescale. However, it should be clearly understood that the health sector cannot act in isolation – success is dependent on total involvement. In order to represent a truly national course of action this must be the responsibility of every governmental, private and nongovernmental sector.

However, this work will never be complete: in a few years these seven project countries will need to reassess vulnerabilities and impacts. They will need to monitor the implementation of their national strategies and evaluate their actions to feed back into policy development, thereby completing the adaptation cycle. But when this time comes, they will have the tools, the national competence and a foundation on which to build.

### List of publications

Several vulnerability assessments; adaptation strategies and action plans; and other technical documents were published during the course of the project.

1. Ministry of Health of the Kyrgyz Republic (2011). *Programme of the health sector of the Kyrgyz Republic on climate change adaptation for 2011–2015*. Bishkek.
2. Ministry of Health Republic of Albania (2012). *Protecting health from climate change in Albania*. Tirana.
3. Ministry of Health Republic of Albania (2011). *Albanian strategy for health system adaptation into the climate change*. Tirana.
4. Ministry of Health of the Republic of Karakalpakstan (2011). *Evaluation report of the practical approach to lung health (PAL) within the WHO project "Protecting health from climate change in Uzbekistan"*. Nukus.
5. Ministry of Healthcare and Social Development of the Arkhangelsk Region and the Northern State Medical University (2012). *Summary – the strategy for adaptation to climate change impacts on the population's health in the Arkhangelsk Region and Nenets Autonomous District of the Russian Federation*. Arkhangelsk, Ministry of Healthcare and Social Development of the Arkhangelsk Region.
6. Ministry of Health of the former Yugoslav Republic of Macedonia (2011). *The effects on health of climate change in the Republic of Macedonia*. Skopje.
7. Ministry of Health of the former Yugoslav Republic of Macedonia and Public Health Institute (2011). *Energy efficiency and renewable energy sources in the health sector – manual for health managers and health workers in Republic of Macedonia*. Skopje, Ministry of Health of the former Yugoslav Republic of Macedonia.
8. United Nations in the Russian Federation (2012). *Climate change impact on public health in the Russian Arctic*. Moscow.
9. WHO Regional Office for Europe (in press). *Protecting health from climate change in Kazakhstan*. Copenhagen.
10. WHO Regional Office for Europe (in press). *Protecting health from climate change in Tajikistan*. Copenhagen.
11. WHO Regional Office for Europe (2013). *Climate change and health: a toolkit to estimate health and adaptation costs*. Copenhagen.
12. WHO Regional Office for Europe (2012). *Establishment of a working group on climate change and its impact on health (HIC) of the European Environment and Health Task Force (EHTF) – meeting report*. Copenhagen.
13. WHO Regional Office for Europe (2012). *Climate change and health: lessons learnt in the WHO European Region – meeting report*. Copenhagen.
14. WHO Regional Office for Europe (2011). *Protecting health from climate change: a seven countries initiative – project results and compendium of project documents in the former Yugoslav Republic of Macedonia 2008–2011*. Copenhagen.
15. WHO Regional Office for Europe (2011). *Climate change and its impact on food and nutrition security – a report on an assessment conducted in four regions of the Autonomous Republic of Karakalpakstan*. Uzbekistan. Copenhagen.
16. WHO Regional Office for Europe (2010). *Protecting health in an environment challenged by climate change: European Regional Framework for Action*. Copenhagen.
17. WHO Regional Office for Europe and Ministry of Health of the Kyrgyz Republic (2011). *Assessment of the impact of climate change in the health of the population of the Kyrgyz Republic – final report*. Copenhagen, WHO Regional Office for Europe.
18. WHO Regional Office for Europe and Ministry of Health Republic of Tajikistan (2012). *Protecting health from climate change in Tajikistan*. Copenhagen, WHO Regional Office for Europe.
19. WHO Regional Office for Europe and Ministry of Health of the former Yugoslav Republic of Macedonia (2011). *Climate change health adaptation strategy and action plan of the former Yugoslav Republic of Macedonia*. Copenhagen, WHO Regional Office for Europe.
20. WHO Regional Office for Europe and Ministry of Health of the former Yugoslav Republic of Macedonia (2011). *Climate change and communicable diseases: a manual for health workers*. Copenhagen, WHO Regional Office for Europe.
21. WHO Regional Office for Europe and Ministry of Health of the former Yugoslav Republic of Macedonia (2011). *Heat–health action plan to prevent the heat waves consequences on the health of the population in the former Yugoslav Republic of Macedonia*. Copenhagen, WHO Regional Office for Europe.

22. UzHydromet (2011). *Climate change and adaptation strategy of the health care sector in the Republic of Uzbekistan*. Tashkent, Centre of Hydrometeorological Service at Cabinet of Ministers of the Republic of Uzbekistan.

In addition, several technical papers were developed as part of the strategy development process or project implementation. These are currently unpublished – some will remain as internal documents; others are being developed for eventual publication.

1. WHO Regional Office for Europe. *Protecting health from climate change in Albania: vulnerability assessment report*.
2. WHO Regional Office for Europe. *National climate change health adaptation strategy and action plan 2011–2020. (Tajikistan)*
3. WHO Regional Office for Europe. *Pilot dust storm early-warning system – a plan for protecting health in Karakalpakstan, Uzbekistan*.
4. WHO Regional Office for Europe. *Protecting health from climate change in Uzbekistan*.
5. WHO Regional Office for Europe. *Report: impact, vulnerability and adaptation assessment of climate change and health in the Republic of Kazakhstan*.
6. WHO Regional Office for Europe. *The climate change and health vulnerability assessment in the Republic of Tajikistan*.