World Health Organization
REGIONAL OFFICE FOR Europe

SDG target 1.5: by 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

SDG target 3.3: by 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, waterborne diseases and other communicable diseases.
SDG target 3.4: by 2030, reduce by one third premature mortality from noncommunicable diseases through prevention and treatment and promote mental health and well-being.
SDG target 3.9: by 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

SDG target 13.1: strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
SDG target 13.3: improve education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

Fact sheets on sustainable development goals: health targets

Climate Change and Health

Climate change, either a direct effect or indirectly from human activity, is putting at risk the achievement of all Sustainable Development Goals (SDGs). Globally, it is expected to cause over 250 000 additional deaths per year between 2030 and 2050 *(1,2)*. Climate-specific actions are necessary to protect people and the planet. Action is necessary across sectors and settings to promote resilience to and mitigation of climate change.

Overview

The health impacts of climate change in the European Region are wide ranging *(3)*. Direct impacts result through progressive temperature increases, heat waves, storms, forest fires, floods or droughts. Indirect impacts are mediated through the effects of climate change on ecosystems and productive sectors such as agriculture, the distribution of plant and animal species, and water and food quantity and quality. Some of the implications of climate change, such as on migration, conflicts over natural resources and political instability, also generate changes in associated economic, environmental and social determinants of health.

Climate change currently contributes to the global burden of disease *(4)*. Observed effects in Europe include changes in the rates of communicable and noncommunicable diseases attributable to changes in temperature, extreme weather events and changes in the distribution of plant species, arthropod vectors, air and food quality *(3)*. Length, frequency and intensity of these effects are projected to further increase with changing climate.

Climate change and SDGs: facts and figures

Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries: climate change directly affects the social and environmental determinants of health – e.g. clean air, safe drinking water, sufficient food and secure shelter *(5)*.

- Extreme high temperatures contribute directly to deaths from cardiovascular and respiratory diseases. Modelling exercises under future warming conditions in 43 selected European Member States have estimated that high ambient temperatures may cause an overall excess between 47 000 and 117 000 in heat-attributible deaths per year during the period 2071–2099 (under the representative concentration pathways 4.5 and 8.5 scenarios, respectively), in addition to the 16 303 heat-attributable deaths estimated under the historical scenario *(6)*. Mediterranean and eastern European countries will be the most affected by heat, but a non-negligible impact will be still registered in northern continental countries.
- Over recent decades, many plant and animal species have shifted their geographical ranges, altered their abundance and shifted their seasonal activities in response to observed climate change (e.g. bird migration or pollen production) *(7)*. These shifts may increase the incidence of pollen allergies and vector-borne diseases in the European Region *(8)*.
- By implementing the Paris Climate Agreement, 74 000 deaths could be avoided across the whole WHO European Region in 2030 if all countries implemented their intended nationally determined contributions to mitigate and reduce the national greenhouse gas emission levels *(3)*.
- Furthermore, such measures have benefits for air quality and thus also for health. The economic gain of reduced ill health, morbidity and mortality in 2030 from decreasing air pollution would represent between 0.4% and 1.2% of the annual gross domestic product of the 53 Member States in the WHO European Region *(9)*.
- Reductions in emission of short-lived climate pollutants, such as black carbon and methane, would slow the rate of global warming while also saving nearly 2.5 million lives per year globally *(10)*.

Integrate climate change measures into national policies, strategies and planning.

- Health systems have an important role to play in reducing climate pollutant emissions *(4)*. Even when evidence is limited, undoubtedly health systems have a substantial impact on the environment by the direct use of energy, patient/staff travel and, to a large extent, the procurement of goods and services *(11)*.
- Health care facilities are highly dependent on access to energy and other natural resources. In the context of wider pressures on environmental systems and increasing concerns about energy security and the cost and availability of a range of natural resources, this provides reason enough for pursuing efforts to foster environmental sustainability in health systems *(11)*.

Reduce premature mortality from noncommunicable diseases: unhealthy dietary patterns have negative effects for the individual, as well as for the environment. Reduction of consumption of animal products would reduce climate pollutant emissions, support improving nutrition and reduce the burden of cardiovascular diseases *(3)*.

- For example, a 30% reduction in the adult consumption of saturated fat from animal sources has been estimated to reduce heart disease in the United Kingdom population by around 15% *(12)*.

Ending the epidemics of communicable diseases: substantial warming at higher latitudes could lead to changes in the geographical distribution of infectious diseases that are currently limited by low-temperature boundaries. For example, the northward extensions in Canada and Scandinavia of tick populations that are vectors for Lyme disease and tick-borne encephalitis *(13,14)*.

Climate change impacts food security. An increase in global temperature of around 4°C compared with that during the late 20th century, compounded with rising global food demand, would increase the likelihood of food insecurity globally and regionally *(15)*.

- In the European Region, southern Europe is likely to experience significant food production losses (of up to 25% in a scenario of 5.4°C temperature increase), while food production in some areas in northern Europe is likely to increase, owing to a prolongation of the growing season with warmer temperatures *(16)*. Increasing frequency of extreme climate events will pose a mounting threat to the security of the Russian Federation's food system *(17)*.
- Climate impacts on food security are a particular concern in central Asia, where droughts may affect child nutrition and growth *(18)*. Estimations suggest that crop yields could decrease by up to 30% in central Asia by 2050 *(19)*.
- On the other hand, food production is a major force in a range of serious environmental problems, for example contributing to air pollution through emission of a number of climate pollutants worldwide, with livestock releasing a substantial amount of carbon dioxide and methane *(12)*. Promoting more sustainable and healthy diets can contribute to both a reduction in greenhouse gas emissions and improved public health and nutritional outcomes *(3)*.
- Climate change can also increase food safety hazards throughout the food chain *(20)*.

Achieve universal access to safe and affordable drinking water: fresh water supply is likely to be affected by increasingly variable rainfall patterns. Scarcity of safe water can compromise hygiene and increase the risk of diarrhoeal and other sanitation-related diseases *(1,21)*.

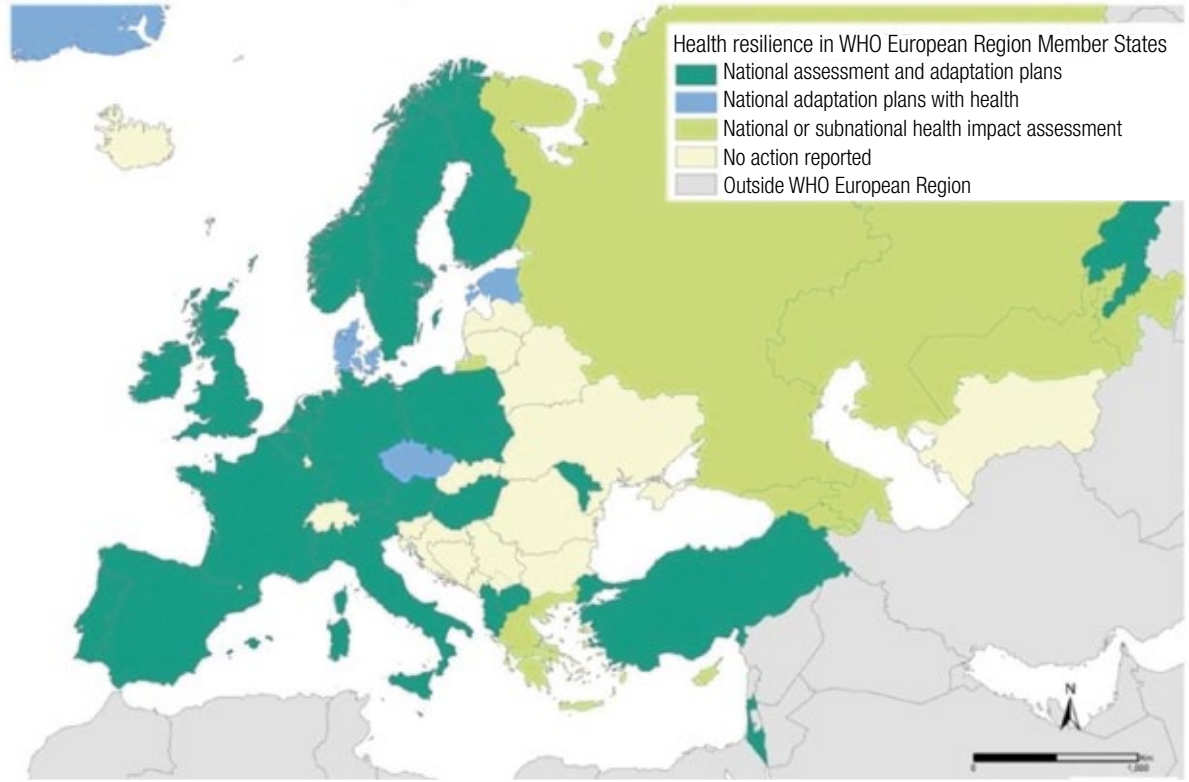
- Globally, each 1°C of temperature increase caused by global warming is projected to result in a 20% reduction in renewable water resources and to affect an additional 7% of the population *(22)*.
- In the European Region, water stress is expected to increase across central and southern Europe and central Asia with the impacts of climate change. The area in the European Union under high water stress is estimated to increase from 19% in 2007 to 35% by the 2070s, by which time the number of additional people affected is expected to reach 16 to 44 million *(23)*.

Climate change is estimated to affect hundreds of millions of people in urban areas around the world. Rising sea levels, increased precipitation, inland floods, more frequent and stronger cyclones and storms, and periods of more extreme heat and cold as a result of climate change will affect health and well-being. On the other hand, cities are major contributor to climate change, and therefore have a major role in mitigation strategies.

- Promotion of safe walking and cycling is a way both to reduce climate change gas emissions and to promote health. Safer active transport reduces rates of obesity, diabetes, coronary heart disease, stroke and traffic injuries *(24)*. In addition, active mobility, such as cycling and walking, can help to prevent nearly 1 million deaths per year associated with insufficient physical activity in the WHO European Region *(25)*.
- If no additional adaptation measures are taken, the number of people affected by coastal flooding in the European Union at the end of the 21st century will range from 775 000 to 5.5 million annually, depending on the emissions scenario *(16,26,27)*.

Fig. 1 shows countries that had carried out an assessment of the mentioned impacts by 2015.

Fig. 1. Member States that have carried out a vulnerability, impact and adaptation assessment and/or developed national adaptation plans, 2015



Source: Improving environment and health in Europe: how far have we gotten? *(28)*.

Disclaimer: The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Commitment to act

At the United Nations Framework Convention on Climate Change Conference of the Parties in Paris in December 2015, all WHO European Region countries adopted the Paris Climate Agreement with the aim of reducing greenhouse gas emissions to limit global warming to 2°C relative to pre-industrial levels (Box 1) *(29)*. The Paris Climate Agreement provides a critical opportunity to advance public health as a central element not only in response to climate change but also to the overall United Nations 2030 Agenda for Sustainable Development. Countries publicly outlined their intended nationally determined contributions, which are voluntary commitments to the collective action toward a zero-carbon, climate-resilient future.

Box 1. The Paris Agreement and climate change and health

The Paris Agreement set out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C and to pursue efforts to limit the temperature increase even further to 1.5°C. The Paris Agreement requires all parties to put forward their best efforts through nationally determined contributions and to strengthen these efforts in the years ahead. It reflects a changing landscape in international climate policy. The Agreement formalized the commitment of countries to achieve voluntary climate-related policy goals and targets. Under the Paris Agreement, WHO European Member States have committed to a 43% reduction in greenhouse gases emissions in 2030 from those in 1990.

To promote health in climate change negotiations, at the 1999, 2004 and 2010 sessions of the WHO Regional Committee for Europe and in the 2008 World Health Assembly, representatives of health ministries agreed on increased action on climate change and health *(30)*.

Since 1999, Member States of the WHO European Region have been committed to action towards mitigation of and adaptation to climate change. The World Health Assembly resolution WHA61.19 on climate change and health urged Member States to prepare for and manage current and projected consequences of a changing climate *(31)*. In March 2010, at the Fifth Ministerial Conference on Environment and Health in Parma, Italy, all Member States in the WHO European Region and the European Commission agreed to the Declaration and Commitment to Act *(32)*. The Parma Declaration led to the European Regional Framework for Action: Protecting health in an environment challenged by climate change *(33)*. The framework supports Member States' action to promote health equity and security, protect health and provide healthy environments in a changing climate in the WHO European Region (Boxes 2 and 3) *(33)*. In June, 2017, at the Sixth Ministerial Conference on Environment and Health, the Parma commitments were reinstated and further reinforced through the Ostrava Declaration *(35)*. Annex I to the Ostrava Declaration proposed the following actions *(36)*.

"Actions

- Develop and implement a national strategy or action plan for public health adaption to climate change.
- Assess climate change risks to health in relevant national policies, strategies and plans.
- Include, on a voluntary basis, health considerations within Member States' commitments to the United Nations Framework Convention on Climate Change.
- Consider climate change adaptation and mitigation in the development of specific environment and health policies.
- Strengthen natural risk reduction policies and early-warning surveillance and preparedness systems for extreme weather events and climate-sensitive disease outbreaks.
- Develop information, tools and methodologies to support authorities and the public to increase their resilience against extreme weather and climate health risks.
- Include the health aspects of climate change in education curricula, non-formal education and workforce continuing professional education.
- Scale up public communication and awareness-raising campaigns on climate change and health.
- Conduct or update national health vulnerability, impact and adaptation assessments of climate change.
- Support research on the effectiveness, cost and economic implications of climate change and health interventions."

Box 2. Leaving no one behind...

Vulnerable populations at higher risk of climate-related hazards: some some population groups are more exposed to specific risks or are more vulnerable because of their personal characteristics (such as age, income, education or health status), broader social and environmental contexts, access to resources, such as health services, or their level of exposure to climate change *(3)*.

Climate-related hazards particularly affect poor populations *(34)*, for example through reduced crop yields, increased food prices and food insecurity. Children are particularly vulnerable to the long-term impacts of climate-related hazards on their physiological and cognitive development. Geographically, populations living in large cities or areas that are mountainous, water stressed or near a coast are considered at high risk. Policies that aim to reduce the effects of climate change need to focus on populations particularly exposed to risk or that are particularly vulnerable.

Box 3. Intersectoral action

Health system strengthening to cope with climate change: during 2008–2012, the WHO Regional Office for Europe coordinated the largest pilot project to date to strengthen health systems to cope with climate change. The overall aim of this initiative was to protect health from climate change through strengthening the health system. The strategy adopted consisted of building capacity in assessing vulnerability, impacts and adaptive capacity in each country. 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
- monitoring air quality.

Multisectoral national steering committees, composed of members from various sectors and government departments, were responsible for guiding the project's implementation. This method of fostering dialogue between government sectors supported the development of climate change strategies and the political commitment to their implementation *(3)*.

Monitoring progress

As proposed in the Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development of the United Nations Economic and Social Council (ECOSOC) *(37,38),* the following will support monitoring progress in climate change.

ECOSOC indicators

13.1.1. Number of deaths, missing people, injured, relocated or evacuated due to disasters per 100 000 people

13.3.1. Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula

13.3.2. Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions

Health 2020 core indicators

1.1.a. Age-standardized overall premature mortality rate (from age 30 to under 70 years) for four major noncommunicable diseases disaggregated by sex: cardiovascular diseases (ICD-10 codes I00–I99), cancer (ICD-10 codes C00–C97), diabetes mellitus (ICD-10 codes E10–E14) and chronic respiratory diseases (ICD-10 codes J40–J47) *(39)*

1.3.a. Age-standardized mortality rates from all external causes and injuries, disaggregated by sex (ICD-10 codes V01–V99, W00–W99, X00–X99 and Y00–Y98) *(39)*

2.1. Life expectancy at birth, disaggregated by sex

WHO support to Member States

The WHO Regional Office for Europe works to identify policy options to help to prevent, prepare for and respond to the health effects of climate change, and supports its Member States in selecting and implementing the most suitable policies, measures and strategies. It supports Member States by building capacity to develop early warning and surveillance systems, and to develop and implement targeted campaigns to address the immediate and future health consequences of climate change.

To support the implementation of the commitments made at the Sixth Ministerial Conference on Environment and Health, the Working Group on Health in Climate will facilitate dialogue among Member States in the WHO European Region and other stakeholders, as well as communication and implementation of commitments to protect health from the adverse effects of climate change.

Partners

The WHO collaborates with the following partners, among others, to mitigate and create resilience against climate change:

- Directorate-General for Climate Action of the European Commission
- European Centre for Disease Control
- European ECO Forum
- European Environment Agency
- Health and Environment Alliance
- United Nations Economic Commission for Europe
- United Nations Food and Agriculture Organization
- United Nations Framework Convention on Climate Change
- United Nations Office for Disaster Risk Reduction
- World Organisation for Animal Health
- World Meteorological Organization.

Resources

- Climate change 2014: impacts, adaptation, and vulnerability – Europe
  http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap23_FINAL.pdf
- Climate change, impacts and vulnerability in Europe 2016
  http://www.eea.europa.eu/publications/climate-change-impacts-and-vulnerability-2016/at_download/file
- Comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010
  http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)61766-8/abstract
- Health and climate change: policy responses to protect public health
  http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60854-6/abstract
- Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s
  http://www.who.int/iris/bitstream/10665/134014/http://apps.who.int//iris/bitstream/10665/134014/1/9789241507691_eng.pdf?ua=1
- Tool: linking carbon reduction to health benefits, version 1.1
  WHO Regional Office for Europe, 2017 in press

Key definitions

- **Climate.** Regularly defined as the average weather or as the statistical description in terms of the mean and variability of relevant quantities over a certain period of time (typically 30 years), as defined by the World Meteorological Organization. The relevant quantities are most often surface variables such as temperature, precipitation and wind *(40)*.
- **Climate change.** The United Nations Framework Convention on Climate Change in Article 1 defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" *(2)*. The World Meteorological Organization describes climate change as "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer" *(40).*
- **Climate change mitigation.** Actions that aim at reducing or preventing emission of greenhouse gases by applying new technologies and renewable energies and changing consumer and management practices.
- **Food insecurity.** Insecure access within a population to sufficient amounts of safe and nutritious food for normal development, growth and an active and healthy life *(41)*.
- **Greenhouse gas emissions.** Gases emitted by various sources responsible for creating a protective layer in the atmosphere that prevents solar radiation from exiting the atmosphere, causing global warming.
- **Weather.** The state of the atmosphere at a particular time, as defined by the various meteorological elements *(40)*.

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