



GERMANY

CLIMATE CHANGE

Germany has a mild humid climate, with monthly mean temperatures ranging from 17 °C in summer to less than 5 °C in winter. Between 1981 and 2001, the annual mean temperature increased by 1.1 °C, while from 1971 to 2001, precipitation increased by 16%. In general, heat-waves and heavy precipitation have occurred more frequently in the past 30 years; however, in the north-east of the country, very low precipitation was observed during the 1990s and in 2003. This warming trend, with high variability from year to year, is likely to continue. It is estimated that, by 2100, the annual mean temperature will be 2–3 °C higher than that for 1961–1990.

HEALTH EFFECTS

To date, no comprehensive, quantitative assessment of observed or projected health effects of climate change has been carried out. The main health risks are considered to be mortality and morbidity caused by extreme weather events, such as heat-waves, cold spells, flooding, droughts and storms. Other health effects are likely to be an increased incidence of cardiovascular problems (provoked by heat), allergies (caused by increased pollen), respiratory diseases (aggravated by increased ground-level ozone and particulate matter) and skin cancer (from increased exposure to ultraviolet radiation). There is a potential risk of increased incidence of certain infectious diseases: endemic pathogens of particular concern include hantavirus (which has a reservoir in small rodents), tick-borne pathogens (*Borrelia*

burgdorferi, tick-borne encephalitis virus), and certain food- and waterborne pathogens.

HEALTH MEASURES TAKEN TO ADAPT TO CLIMATE CHANGE

Alert systems

A number of alert systems for climate-associated environmental determinants relevant for the protection of health are operating on the national scale: the heat health warning system (HHWS) of the German Meteorological Service (*Deutscher Wetterdienst*, DWD); the ozone monitoring and early warning system of the Federal Environment Agency (*Umweltbundesamt*, UBA) and the federal states; the monitoring of solar ultraviolet radiation of the Federal Office for Radiation Protection (*Bundesamt für Strahlenschutz*, BfS); and the monitoring and prediction of pollen movements of the DWD.

Surveillance

The Robert Koch Institute (RKI) in Berlin is responsible for national surveillance of infectious diseases. Several climate-sensitive diseases or pathogens are included in the system, for example cholera, typhoid fever and hantavirus, as well as foodborne and waterborne infectious diseases (e.g. *Campylobacter* spp. and *Salmonella* spp.). The existing surveillance systems for drinking-water and food hygiene are considered sufficiently powerful and adaptable to react to new challenges that might arise from regional warming. Further, the German network “Rodent-borne pathogens” investigates rodent population dynamics, and monitors the prevalence and evolution of hantaviruses and other rodent-associated pathogens.



Hiking in Berchtesgaden
(Bavaria, Germany)

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COMMUNICATION

In its Strategy for Adaptation to Climate Change, the German Federal Government stresses that, while the health system is well developed, the German population is still not sufficiently aware

of climate-induced health problems. The federal and state authorities are, therefore, invited to target the general public, individual risk groups, and health care and disaster control personnel with information on coping with the health effects of weather extremes and natural disasters.

INSTITUTIONAL SET-UP

- The German Strategy for Adaptation to Climate Change (*Deutsche Anpassungsstrategie an den Klimawandel*, DAS) lays the foundation for a cross-sectoral, medium-term, step-by-step process to be undertaken in cooperation with the federal states and civil groups. It aims to assess the risks of climate change, and identify and implement effective adaptation measures.
- The Action Programme Environment and Health (APUG) was set up by the Federal Ministry for Health and Social Security and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety in 1999. The Federal Ministry of Consumer Protection, Food, and Agriculture became involved in 2002. The Action Programme receives scientific support through the Federal Office for Radiation Protection (BfS), the Federal Institute for Risk Assessment (*Bundesinstitut für Risikobewertung*, BfR), the Robert Koch Institute, and the Federal Environment Agency. Informing the public about environmental health risks is one of the main components of the Action Programme.
- The Competence Centre on Climate Impact and Adaptation (Kompetenzzentrum Klimafolgen und Anpassung, KomPass) provides guidance and advice on adaptation activities in Germany. The Centre works with scientists and ministries and supports the implementation of the German Strategy for Adaptation to Climate.

CO-BENEFITS FOR HEALTH OF CLIMATE CHANGE MITIGATION MEASURES

In 2007, Germany adopted a package of 29 measures for future climate and energy policies, which supplement and extend existing legislation. To date, no formal health impact assessment of these measures has been carried out. However, it can be assumed that several of the climate-related acts and ordinances have a potential benefit for human health, for example those related to transport, housing and promotion of renewable energy.

REFERENCES

The German Strategy for Adaptation to Climate Change; <http://www.bmu.de/english/climate/downloads/doc/42841.php>.

Climate change in Germany. Vulnerability and adaptation of climate sensitive sectors. Dessau, UBA, 2005; <http://www.umweltdaten.de/publikationen/fpdf-l/2974.pdf>.

Germany in the midst of climate change. Adaptation is necessary. Dessau, UBA, 2008; <http://www.umweltdaten.de/publikationen/fpdf-l/3500.pdf>.