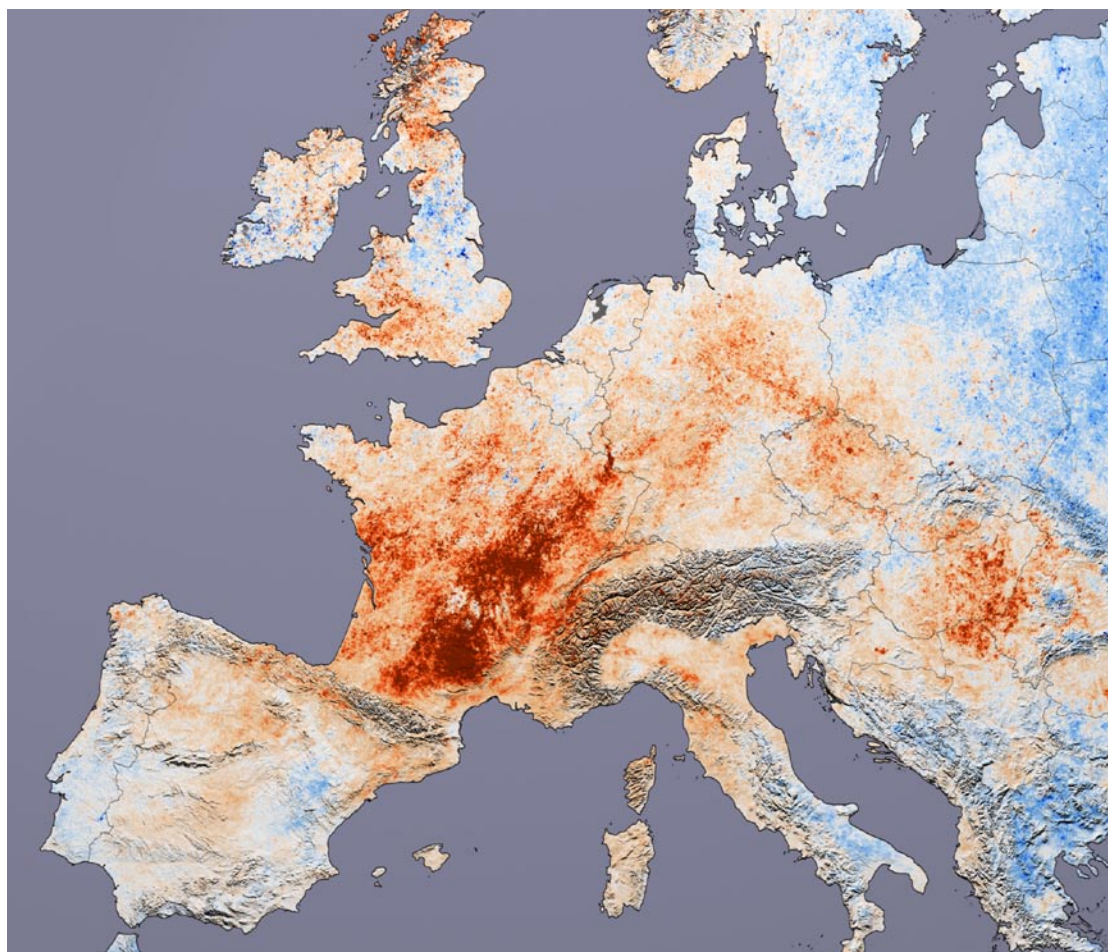


## HEAT STRESS, WATER QUALITY AND INFECTIOUS DISEASES

# Climate change and public health

Many scientists are convinced that the effects of climate change on public health are substantial. Higher temperatures and heavier rainfall can cause more heat stress, waterborne infections and lethal infectious diseases. Nevertheless, more research is needed to draw clear-cut conclusions and tackle the problems.

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This image shows the differences in day time land surface temperatures collected by the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite. A blanket of deep red across southern and eastern France shows where temperatures were 10 °C hotter in 2003 than in 2001.

LIGHTROOM PHOTOS / NASA

The summer of 2003 is engraved in the memories of European scientists doing research into the effects of climate change on public health. The continuous heat caused enormous problems for the elderly as well as for people suffering from cardiovascular and respiratory diseases. Political commotion arose in France when it turned out that almost 15,000 more people had died as a consequence of the heat wave. In hindsight, public opinion claimed that politicians should have intervened. The mortality rates during the heat wave were also much higher than usual in other countries, such as the Netherlands and Germany. Not only do mortality rates rise during a heat wave. More people are admitted to hospital, physical discomfort increases – particularly among the elderly – and more people take sick leave from work.

#### **Too little attention**

In large parts of the world, heat stress is one of the most obvious effects that climate change can have on our health, according to scientists. Particularly in cities, vulner-

able groups may suffer from dehydration, or respiratory problems caused by summer smog. However, a warmer climate also has its advantages. Mortality rates decrease when winters are milder. The exact effects of climate change on our health are less straightforward than we might think. “We simply still know too little on this subject. Governments and health institutions often pay little attention to this subject”, says Pim Martens, co-editor-in-chief of the international *EcoHealth Journal*, and Scientific Director of the International Centre for Integrated Assessment and Sustainable Development (ICIS) at the University of Maastricht.

## **Almost 15,000 more people died following a heat wave in France in 2003**

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#### **Increase in exotic viruses**

Higher temperatures and more hours of sunshine can cause not only heat stress but also the outbreak of certain pathogens in ponds and lakes. The researchers of the Federal Institute of Hydrology in the German city of Koblenz are concerned about the increase in micro-organisms, such as vibrio

vulnificus, in warm seawater and rivers. This bacteria can cause serious infections to small superficial skin wounds, which can be sometimes fatal.

With warmer summers and milder winters the incidence of certain infectious diseases transmitted by insects might increase. The survival probability of those disease carriers is increasing and they can remain active for longer periods. In north-west Europe, for example, the rapid increase in the incidence of Lyme disease is associated with climate change. Although other aspects, such as changes in the landscape or recreational behaviour, can also play a role. Moreover, the habitats of all kinds of insects are shifting as a result of changes in temperature or rainfall. As a result, countries will be faced with diseases that otherwise only occurred in hotter or wetter regions. The number of Asian tiger mosquitoes in Italy is increasing and has already sparked local outbreaks of the Chikungunya virus, which can cause infections in arm and leg joints that last for months. Of the

200 individuals who were infected in 2007, one person died. In Portugal researchers are even worried about a possible outbreak of yellow fever.

#### **Africa and Asia more vulnerable**

The problems of the developed countries, however, are nothing compared to the concerns that scientists from Asia and Africa have about the rapid increase in fatal infectious diseases such as cholera and malaria.

Dr Andrew Githeko of the Kenya Medical Research Institute sees that each of the African deltas has its unique health profile. “For example deltas in Mozambique have a history of malaria, cholera, typhoid plague and leptospirosis outbreaks after severe flooding events. The Niger delta’s main health problem is lack of safe drinking water. Much of the water has been contaminated by oil drilling. The Nile Delta has seen an increase in filariasis as mosquito breeding grounds have grown. Schistosomiasis is the main parasitic disease in

Egypt, while outbreaks of West Nile virus are expected to increase. All these health conditions are related to water. Increased flooding due to climate change will in one way or the other increase the impact of these diseases on the densely populated deltas.”

Ali Shafqat Akanda of Tufts University in Medford, USA, has done a lot of research into the spread of cholera in Bangladesh. Two peaks in outbreaks of cholera that strongly influence one another can be observed in that country. During the dry season, the influx of seawater in the delta creates ideal conditions for the disease-carrying bacteria while, during the wet season, floods spread the micro-organisms across an even larger area. “A growing number of scientists have indicated that we will be facing more frequent and more intensive floods and droughts. This might extend the rainy season during which cholera is spread and increase the occurrence of new species of bacteria.”

#### **Better health care and clean water**

The threat of cholera can be tackled to a certain extent. “It might be possible to cut back the spread of the disease during the dry and wet season if the freshwater supply from the rivers in the hinterland can be increased during the dry season”, Akanda argues. Better health care and clean drinking water will, of course, also help fight this fatal disease. Some scientists have even suggested that climate change might encourage rich countries to earmark extra money for better amenities in the poorer countries. Akanda supports this view. In addition, it is essential to better understand the complex relationship between climate variables and health problems. He agrees with his colleague Martens: “We simply still know too little about this.” ■

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