Climate change and human health - risks and responses. Summary. WHO, 2003, ISBN 9241590815

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Global climate change and health: an old story writ large

Climate change poses a major, and largely unfamiliar, challenge. This publication describes the process of global climate change, its current and future impacts on human health, and how our societies can lessen those adverse impacts, via adaptation strategies and by reducing greenhouse gas emissions.

In 1969, the Apollo moon shot provided extraordinary photographs of this planet, suspended in space. This transformed how we thought about the biosphere and its limits.

Our increasing understanding of climate change is transforming how we view the boundaries and determinants of human health. While our personal health may seem to relate mostly to prudent behaviour, heredity, occupation, local environmental exposures, and health-care access, sustained population health requires the life-supporting "services" of the biosphere. Populations of all animal species depend on supplies of food and water, freedom from excess infectious disease, and the physical safety and comfort conferred by climatic stability. The world's climate system is fundamental to this life-support.

Today, humankind's activities are altering the world's climate. We are increasing the atmospheric concentration of energy-trapping gases, thereby amplifying the natural "greenhouse effect" that makes the Earth habitable. These greenhouse gases (GHGs) comprise, principally, carbon dioxide (mostly from fossil fuel combustion and forest burning), plus other heat-trapping gases such as methane (from irrigated agriculture, animal husbandry and oil extraction), nitrous oxide and various human-made halocarbons.

In its Third Assessment Report (2001), the UN's Intergovernmental Panel on Climate Change (IPCC) stated: "There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities." (1).

During the twentieth century, world average surface temperature increased by approximately 0.6ºC, and approximately two-thirds of that warming has occurred since 1975. Climatologists forecast further warming, along with changes in precipitation and climatic variability, during the coming century and beyond. Their forecasts are based on increasingly sophisticated global climate models, applied to plausible future scenarios of global greenhouse gas emissions that take into account alternative trajectories for demographic, economic and technological changes and evolving patterns of governance.

The global scale of climate change differs fundamentally from the many

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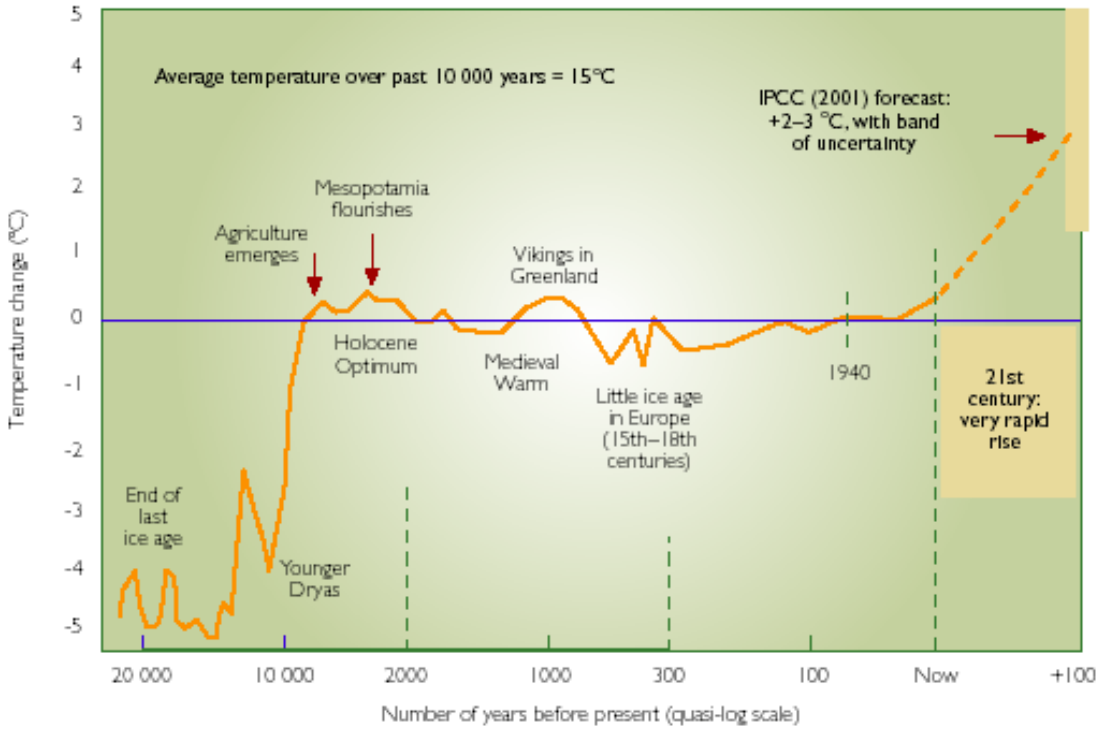
other familiar environmental concerns that refer to localised toxicological or microbiological hazards. Indeed, climate change signifies that, today, we are altering Earth's biophysical and ecological systems at the planetary scale – as is also evidenced by stratospheric ozone depletion, accelerating biodiversity losses, stresses on terrestrial and marine food-producing systems, depletion of freshwater supplies, and the global dissemination of persistent organic pollutants.

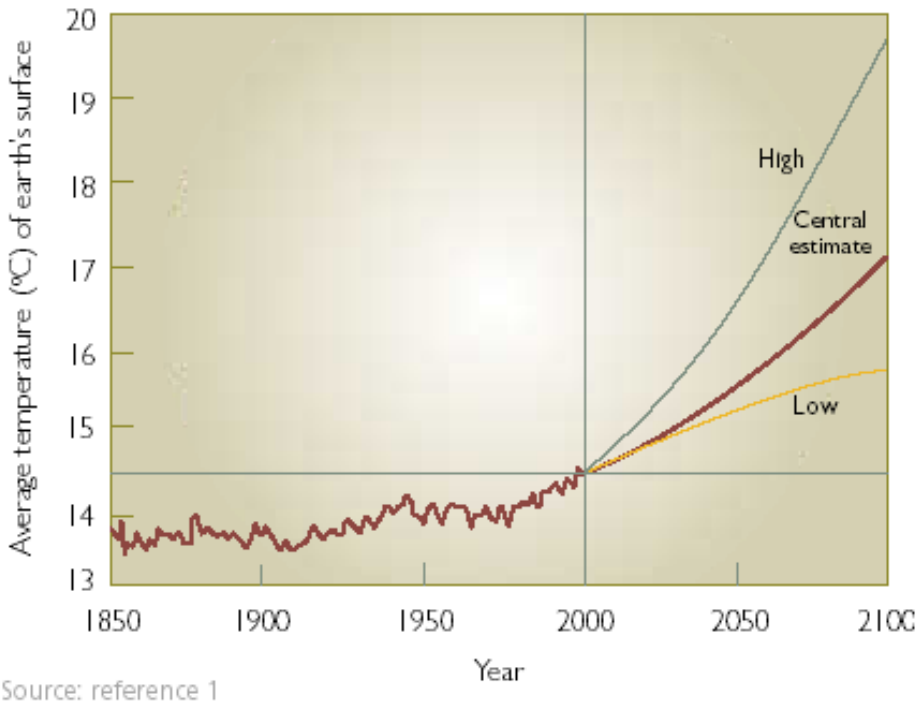
Human societies have had long experience of naturally-occurring climatic vicissitudes (Figure 1.1). The ancient Egyptians, Mesopotamians, Mayans, and European populations (during the four centuries of the Little Ice Age) were all affected by nature's great climatic cycles. More acutely, disasters and disease outbreaks have occurred often in response to the extremes of regional climatic cycles such as the El Niño Southern Oscillation (ENSO) cycle (2).

Figure 1.1. Variations in Earth's average surface temperature, over the past 20,000 years



The IPCC (2001) has estimated that the global average temperature will rise by several degrees centigrade during this century. As is shown in Figure 1.2, there is unavoidable uncertainty in this estimate, since the intricacies of the climate system are not fully understood, and humankind's developmental future cannot be foretold with certainty.

Figure 1.2 Global temperature record, since instrumental recording began in 1860, and projection to 2100, according to the IPCC



Source: reference 1

World temperature has increased by around 0.4ºC since the 1970s, and now exceeds the upper limit of natural (historical) variability. Climatologists assess that most of that recent increase is due to human influence.

Potential health impacts of climate change

Change in world climate would influence the functioning of many ecosystems and their member species. Likewise, there would be impacts on human health. Some of these health impacts would be beneficial. For example, milder winters would reduce the seasonal winter-time peak in deaths that occurs in temperate countries, while in currently hot regions a further increase in temperatures might reduce the viability of disease-transmitting mosquito populations. Overall, however, scientists consider that most of the health impacts of climate change would be adverse.

Climatic changes over recent decades have probably already affected some health outcomes. Indeed, the World Health Organisation estimated, in its "World Health Report 2002", that climate change was estimated to be responsible in 2000 for approximately 2.4% of worldwide diarrhoea, and 6% of malaria in some middle-income countries (3). However, small changes, against a noisy background of ongoing changes in other causal factors, are hard to identify. Once spotted, causal attribution is strengthened if there are similar observations in different population settings.

The first detectable changes in human health may well be alterations in the geographic range (latitude and altitude) and seasonality of certain infectious diseases – including vector-borne infections such as malaria and dengue fever, and food-borne infections (e.g. salmonellosis) which peak in the warmer months. Warmer average temperatures combined with increased climatic variability would alter the pattern of exposure to thermal extremes and resultant health impacts, in both summer and winter. By contrast, the public health consequences of the disturbance of natural and managed food-producing ecosystems, rising sea-levels and population displacement for reasons of physical hazard, land loss, economic disruption and civil strife, may not become evident for up to several decades.

Conclusion

Unprecedentedly, today, the world population is encountering unfamiliar human-induced changes in the lower and middle atmospheres and world-wide depletion of various other natural systems (e.g. soil fertility, aquifers, ocean fisheries, and biodiversity in general). Beyond the early recognition that such

changes would affect economic activities, infrastructure and managed ecosystems, there is now recognition that global climate change poses risks to human population health.

This topic is emerging as a major theme in population health research, social policy development, and advocacy. Indeed, consideration of global climatic-environmental hazards to human health will become a central role in the sustainability transition debate.

References

1. Intergovernmental Panel on Climate Change (IPCC). Climate Change 2001: Third Assessment Report (Volume I). Cambridge: Cambridge University Press, 2001.

2. Fagan, B. Floods, Famines and Emperors. El Nino and the Fate of Civilisations. New York: Basic Books, 1999.

3. WHO. World Health Report 2002: Reducing risks, promoting healthy life. WHO, Geneva, 2002.

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