

MANAGING THE HEALTH EFFECTS OF CLIMATE CHANGE

3 Water and Sanitation

Climate change is not just an environmental issue—it is also a health issue. The major health threats due to climate change are caused by changing patterns of disease, water and food insecurity, vulnerable shelter and human settlements, extreme climatic events, and population growth and migration.

The UCL Lancet Commission on Managing the Health Effects of Climate Change

London's leading multidisciplinary university, UCL, has teamed up with the *Lancet*, one of the world's leading medical journals, to launch a joint commission to study and report on managing the human-health effects of climate change. Chaired by Professor Anthony Costello of the UCL Institute for Global Health, the commission's membership includes 24 academics from a wide range of disciplines varying from anthropology to mathematics.

For detail and references, please see 'The UCL Lancet Commission on Managing the Health Effects of Climate Change' published in the *Lancet*, Issue 373, May 2009 (Costello *et al*).

Safe and reliable access to clean water and sanitation is crucial for good health. Biological or chemical contamination of water causes diarrhoeal disease. Poor drainage in human settlements increases the risk of exposure to contaminated water and provides a suitable habitat for mosquitoes, increasing the incidence of water-borne and vector-borne disease. As a result of climate change average annual rainfall is forecast both to increase in some regions and to decrease in others. The potential for a reduction in water scarcity resulting from increased annual rainfall will rely on the capacity to safely store additional water.

Droughts and floods are likely to increase in frequency and intensity. Even for areas of increased annual rainfall the probability of drought will increase, as additional rainfall will tend to come as severe rainfall, followed by less rainfall.

Glacial melting will have drastic effects on fresh water availability. Glacial melting is predicted to increase, impacting more than a sixth of the world's population currently living in glacial-fed water catchments, and contributing to rising sea levels with global consequences. In the short-term, peak flow in glacial-fed rivers will increase but in the long-term, river flow will be dramatically reduced. Earlier snow thawing will bring the time of peak river flow forwards in the year, exacerbating dry season water scarcity.

Scarcity and Lack of Access

- In 2002, 21 per cent of people living in developing countries did not have sustained access to an improved water source and 51 per cent did not have access to improved sanitation.
- In 1995 nearly 1.4 billion people were living in water stressed regions.
- In Delhi (India), 15 million people face serious water shortages, with water being transported up to 300 km. The projected population of this municipality is more than 30 million by 2025.

The Main Challenges

The informational challenge presented by climate change in relation to water and sanitation includes three crucial elements:

- The generation of information – there is currently a lack of region-specific projections for climate change and for health related exposures and impacts.
- The dissemination of information; ensuring that the necessary information is available and accessible in the right place at the right time.

- Addressing the complexity and uncertainty inherent in modelling the consequences climate change; climate change is not an individual risk factor but is instead an amplifier of existing health risks and is therefore complicated to model.

The planning and implementation of water resource and infrastructure management is currently based on a stable climate. Water resource managers and policy makers need to shift the focus from models based on historical data to planning for future uncertainty. Assessment of how effective currently recommended interventions will be in the context of a changed climate should be conducted. Along with an understanding of the future consequences of climate change, planning and managing water resources and infrastructure necessitates an understanding of regional climate systems.

The challenge of poverty and inequality demands additional consideration in the context of climate change for three primary reasons:

- The most severe public health consequences of climate change will be experienced in the world's poorest countries, widening already shocking global health inequalities.
- Basic infrastructure for much of the world's population is currently inadequate to meet essential healthcare needs; our ability to cope effectively with the health consequences of natural disasters is already insufficient as a result of this.
- Climate change will deepen gender inequalities. The weak socio-economic position of women relative to men in some societies increases their vulnerability to climate change.
- Current funds are insufficient to cover the future costs of climate change-related adaptation.

The need to provide water, sanitation and drainage services to the world's poor is made even more urgent in the context of climate change. Inadequate water and sanitation supplies exacerbate the already desperate need for access to good primary health care in populations vulnerable to climate change impacts.

Populations in good health are less vulnerable to water-borne disease and good primary health care will improve resilience to water-borne and sanitation-related disease. Primary healthcare itself acts as an early warning system for water-borne disease epidemics and is essential in preventing and containing water borne illness.

The technological challenge comprises three key elements:

- Appropriate technologies must be adapted to local conditions and should take into account local knowledge, skills and culture.
- Technologies should be developed to address the negative public health consequences of climate change in both poor and rich countries; technological development must not solely focus on markets for technologies in rich countries.
- Strengthening educational and scientific bases to enhance capacity for adaptation should develop the knowledge capacity of countries.

The application of appropriate technology could work to reduce the threat of climate change to water resources. Technologies should be developed to exploit currently under-utilised groundwater resources and build resilience into water and sanitation infrastructure. Systems should be designed to withstand high intensity rainfall events, drought conditions and keep wastage of clean water to a minimum.

The increasing importance of systems to safely store and treat water, and technologies for using

alternative water supplies such as waste-water recycling and desalination, needs to be recognised.

The increasing frequency of extreme weather events necessitates the provision of emergency water and sanitation technologies and their availability for emergency deployment must be ensured.

The socio-political challenge involves the consideration of four main issues:

- The need for movement to a low carbon economy. This will have positive benefits for global health from both improvement in lifestyle and through reduction of the negative health impacts of climate change.
- Climate change does not respect national borders. Global governance must be a central feature of discussions concerning climate change and health.
- Solving the problems resulting from climate change will require an interdisciplinary approach.

The effects of climate change on water, such as shifting freshwater resource availability, will influence migration presenting new social, political and epidemiological challenges. The misuse of water, such as that used for specialised forms of agribusiness, must be identified since they may directly undermine efforts to tackle climate change. Furthermore, the potential for the use of water as a weapon must be recognised and steps taken to prevent this.

The institutional challenge is overarching and is concerned with governance. There are four main considerations:

- The institutional challenge requires coordination with a vertical and a horizontal dimension. Intervention should occur at different levels of government.

- Horizontal interaction bridging the gaps between and within governments is necessary for a coordinated approach. Efficient responses to health concerns arising from climate change will necessitate involvement of actors from all sectors and across governments.
- A global agenda must be developed through global cooperation and global representation in task forces.
- Governments must face nationwide challenges in reducing carbon emissions. They must identify locally relevant adaptation technologies without compromising growth or harming health. The health effects of climate change need to be integrated into national plans across sectors and tiers.

Global financial institutions and donors have a key role to play in financing the construction and extension of water and sanitation infrastructure. Governments need to ensure that water management actors, projects and policy-makers take climate change into account in the planning and implementation of operations.

As water becomes an increasing focus of competition due to water scarcity integrated water management between sectors will become more important, and integrated water resources management should be promoted.

Trans-boundary management of water resources requires inter-governmental dialogue to avoid resource conflict, and adaptations for this should be integrated into regional, national and global strategies. Institutions also play an important role in planning for disaster management. This is an essential adaptation to climate change and rapid response plans to flood, drought and other climate change related disasters must be

developed to control disease outbreaks and limit adverse health impacts.

Conclusions

- Climate change adaptation and mitigation are central to overall development policy across government departments and should be taken into consideration for all governance actions.
- Climate change makes the provision of water, sanitation and drainage services to the world's poor more urgent. Adequate access to clean water and sanitation is crucial for good health.
- Glacial melting will have drastic effects on fresh water availability. Governments must ensure safe storage and treatment of water, reduce water wastage and enable the use of alternative water supplies.
- Droughts and floods are likely to increase in frequency and intensity.
- Accountability mechanisms are crucial. New funding and networks are required to monitor what is happening in government, civil society, academia, local government and communities, especially in the most vulnerable populations.
- Individuals, organisations and governments all have a vital role to play in advocating for and implementing change at a variety of levels.
- The application of appropriate technology could work to reduce the threat of climate change to water resources.
- Global task forces, research and advocacy groups need to adequately represent and involve those who will be most affected by climate change. Health can play a crucial role in strengthening carbon mitigation debates and targets.
- A comprehensive solution to the health problems of climate change will need to move beyond responses internal to health systems. Health systems must not simply act as a platform for the delivery of clinical services, but also provide the foundation for an effective public health response to the many climate-induced threats to health.

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Managing the health effects of climate change: Changing patterns of disease and mortality
Managing the health effects of climate change: Food
Managing the health effects of climate change: Water and sanitation

Managing the health effects of climate change: Shelter and human settlements
Managing the health effects of climate change: Extreme events
Managing the health effects of climate change: Population and migration

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