3

International consensus on the science of climate and health: the IPCC Third Assessment Report

Through recent research, our understanding of climate-health relationships has increased rapidly, largely due to the stimulus of the IPCC and other policy-related reviews at regional and national levels.

In the early 1990s there was little awareness of the health risks posed by global climate change. This reflected a general lack of understanding of how the disruption of biophysical and ecological systems might affect the longer-term wellbeing and health of populations. There was little awareness among natural scientists that changes in their particular objects of study – climatic conditions, biodiversity stocks, ecosystem productivity, and so on – were of potential importance to human health. Indeed, this was well reflected in the meagre reference to health risks in the first major report of the UN's Intergovernmental Panel on Climate Change (IPCC), published in 1991.

Subsequently, the situation has changed. The IPCC Second Assessment Report (1996) devoted a full chapter to the potential risks to health. The Third Assessment Report (2001) did likewise, this time including discussion of some early evidence of actual health impacts, along with assessing potential future health effects. That report also highlighted the anticipated health impacts by major geographic region.

The IPCC was established by WMO and UNEP in 1988. The IPCC's role is to assess the world's published scientific literature on: (i) how human-induced changes to the lower atmosphere, via the emission of greenhouse gases, have influenced and are likely to influence world climatic patterns; (ii) how this does, and in future would, affect various systems and processes important to human societies; and (iii) the range of economic and social response options available to policy-makers to avert climate change and to lessen its impacts.

The IPCC's work has been done by many hundreds of scientists, world-wide. On a five-yearly basis, national governments propose scientists with expertise in the many topic areas included within this comprehensive review task. Topic review teams are then chosen to ensure proper geographic and disciplinary representation. Excluding the small number of scientists working at IPCC secretariat level, all this work of reviewing, discussing and writing is contributed voluntarily.

The IPCC's draft assessments are subject to a series of internal and external peer-review processes. The final wording of IPCC report summaries are subject, via formal international conferences, to detailed and systematic scrutiny by governments.

The IPCC's assessment of health impacts

In its Third Assessment Report the IPCC concluded that:
"Overall, climate change is projected to increase threats to human health, particularly in lower income populations, predominantly within tropical/subtropical countries."

That summary went on to state:"Climate change can affect human health directly (e.g., impacts of thermal stress, death/injury in floods and storms) and indirectly through changes in the ranges of disease vectors (e.g., mosquitoes), water-borne pathogens, water quality, air quality, and food availability and quality. The actual health impacts will be strongly influenced by local environmental conditions and socio-economic circumstances, and by the range of social, institutional, technological, and behavioural adaptations taken to reduce the full range of threats to health."[1]

Broadly, a change in climatic conditions can have three kinds of health impacts:

- Those that are relatively direct, usually caused by weather extremes.
- The health consequences of various processes of environmental change and ecological disruption that occur in response to climate change.
- The diverse health consequences – traumatic, infectious, nutritional, psychological and other – that occur in demoralized and displaced populations in the wake of climate-induced economic dislocation,

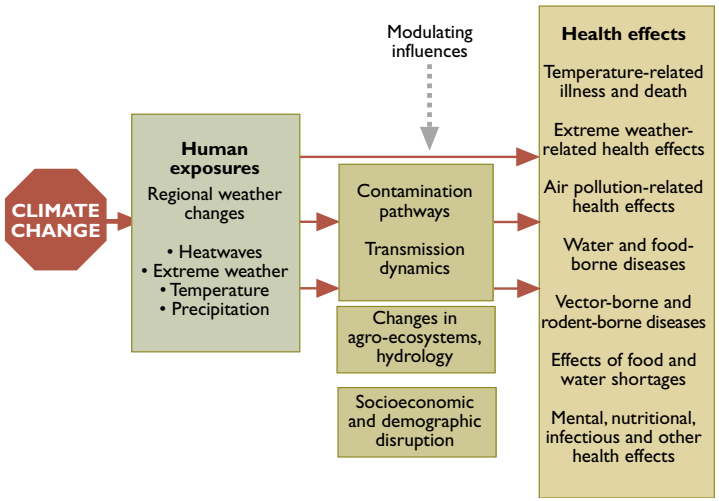
environmental decline, and conflict situations.

These several pathways are illustrated in Figure 3.1.

Our understanding of the impacts of climate change and variability on human health has increased considerably in recent years. However, several basic issues complicate this task:

- Climatic influences on health are often modulated by interactions with other ecological processes, social conditions, and adaptive policies. In seeking explanations, a balance must be sought between complexity and simplicity.
- There are many sources of scientific and contextual uncertainty. The IPCC has therefore sought to formalise the assessment of level of confidence attaching to each health impact statement.
- Climate change is one of several concurrent global environmental changes that simultaneously affect human health – often interactively.[3] A good example is the transmission of vector-borne infectious diseases, which is jointly affected by climatic conditions, population movement, forest clearance and land-use patterns, biodiversity losses (e.g., natural predators of mosquitoes), freshwater surface configurations, and human population density.[4]

Figure 3.1. Pathways by which climate change affects human health (modified from reference 2)



The IPCC concluded, with high confidence, that climate change would cause increased heat-related mortality and morbidity, decreased cold-related mortality in temperate countries, greater frequency of infectious disease epidemics following floods and storms, and substantial health effects following population displacement from sea level rise and increased storm activity.

For each potential impact of climate change, certain groups will be particularly vulnerable to disease and injury. The vulnerability of a population depends on factors such as population density, level of economic development, food availability, income level and distribution, local environmental conditions, pre-existing health status, and the quality and availability of public health care.[5] For instance, those most at risk of being harmed by thermal extremes include socially isolated city dwellers, the elderly and the poor. Populations living at the present margins of malaria and dengue, without effective primary health care, will be the most susceptible if these diseases expand their geographic range in a warmer world.

The IPCC report also underscores that our understanding of the links between climate, climate change and human health has increased considerably over the last ten years. However, there are still many gaps in knowledge about likely future patterns of exposure to climatic-environmental changes, and about the vulnerability and adaptability of physical, ecological and social systems to such climate change.