

Climate change impacts beyond 2050 need attention

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The greatest risks of climate change such as food shortages lie beyond 2050 and this makes it difficult for researchers, but big, uncertain risks must not be ignored, according to the University of Auckland's Professor Alistair Woodward.

Professor Woodward is the head of Epidemiology and Biostatistics at Auckland. He and Professor John R Porter from the Department of Plant and Environmental Sciences at the University of Copenhagen, have written on [food](#), hunger, health and [climate change](#) in the latest issue of the medical journal, *The Lancet* this week.

They were commenting on a scientific article by Marco Springmann (from Oxford University) and his colleagues, published in the same issue of *The Lancet* and providing the most advanced projections so far of the effects of climate change on food and health for 155 regions in the year 2050.

Professors Woodward and Porter say that climate change will slow progress, cutting the anticipated improvement in food availability by about a third, and that these changes will be associated with about 529.000 additional deaths in 2050.

But what happens after 2050 is even more important.

"There are lots of uncertainties. They include variations in emissions pathways, climate responses to raised concentrations of greenhouse

gases, effects on natural systems, and the sensitivity of human populations to environmental change," says Professor Woodward.

"These mean that the further you go into the future, the greater the variability in the outputs from the models. To be safe, many assessments of climate change, including that by Springmann and his colleagues, focus on the next few decades," he says. "But what if there is good reason to believe the greatest risks lie further out, beyond 2050?"

Governments are familiar with the need to plan for worst-case scenarios, for example, terrorist attacks – and the same level of preparedness must apply to climate change.

The two professors give some examples of extreme, but not implausible, effects on food production beyond 2050.

Moderate-to-heavy-intensity work outdoors, as is necessary for agriculture, will more likely than not be physiologically impossible during the hottest month of the year in northern India in the early part of next century.

Failure of the rice crop in southern China due to high temperature stress can change from a one in more-than-100-year event to become a one in 10-year event under a scenario of 2–3 °C global warming and a one in four year event in the case of 5–6°C global warming.

"Restricting our view to what might happen in the next 30 to 40 years is understandable in terms of conventional concerns with data quality and model stability. But there is a danger here that we might underestimate future threats, and undervalue present actions needed to mitigate and adapt," says Professor Woodward.

"A worst-case analysis is not unusual in risk assessments in other areas

when the stakes are high," he says. "Those responsible for national security, high-level decision making in the insurance industry, and business planning take seriously the possibility of devastating outcomes, even if such events seem unlikely and are difficult to quantify."

Professors Woodward and Porter also commented on the agreement made by governments in December 2015 at the climate change conference in Paris.

This includes nearly every country and accepts the need to hold warming by 2100 to 2°C above pre-industrial levels, and if possible to no more than 1.5°C above these levels.

The governments agreed that global emissions will peak 'as soon as possible' and then fall rapidly to reach zero net emissions in the second half of this century.

"To achieve such ambitious goals, the world must make radical changes in the use of energy," says Professor Woodward.

"Without due care, responses to climate change could have greater effects, in the short term, than climate change itself."

"Fossil energy is a major input into food production through nitrogen fertilizer and irrigation, and to find ways of reducing emissions without damaging health will be a challenge," he says.

"Expanded use of biofuels might compete with food crops, carbon pricing regimes could aggravate food insecurity in the poorest populations," he says. "While culling of livestock to control methane emissions might be detrimental unless alternative sources of protein, energy, and nutrients are available."

More information: Marco Springmann et al. Global and regional health effects of future food production under climate change: a modelling study, *The Lancet* (2016). [DOI: 10.1016/S0140-6736\(15\)01156-3](https://doi.org/10.1016/S0140-6736(15)01156-3)

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