Acute food shortages predicted for end of century

Rapidly warming climate is likely to seriously alter crop yields in the tropics and subtropics by the end of this century and, without adaptation, will leave half the world's population facing serious food shortages, new research shows.

"The stresses on global food production from temperature alone are going to be huge, and that doesn't take into account water supplies stressed by the higher temperatures," said David Battisti, a University of Washington atmospheric sciences professor. Battisti is lead author of the study in the 9 January edition of *Science*. He collaborated with Rosamond Naylor, director of Stanford University's Programme on Food Security and the Environment, to examine the impact of climate change on the world's food security.

"This is a compelling reason for us to invest in adaptation, because it is clear that this is the direction we are going in terms of temperature and it will take decades to develop new food crop varieties that can better withstand a warmer climate," Naylor said. "We are taking the worst of what we've seen historically and saying that in the future it is going to be a lot worse unless there is some kind of adaptation."

By combining direct observations with data from 23 global climate models, Battisti and Naylor determined there is a greater than 90% probability that by 2100 the lowest growing-season temperatures in the tropics and subtropics will be higher than any temperatures recorded there to date.
They used the data as a filter to view historic instances of severe food insecurity, and concluded such instances are likely to become more commonplace. Those include severe episodes in France in 2003 and Ukraine in 1972. In the case of the Ukraine, a near-record heat wave reduced wheat fields and contributed to disruptions in the global cereal market that lasted two years.

"I think what startled me the most is that when we looked at our historic examples there were ways to address the problem within a given year. People could always turn somewhere else to find food," Naylor reported. "But in the future there's not going to be any place to turn unless we rethink our food supplies."

Testosterone-blocking chemicals found in UK rivers

New research by Brunel University, the Universities of Exeter and Reading and the Centre for Ecology and Hydrology, shows for the first time how a group of testosterone-blocking chemicals is finding its way into UK rivers, affecting wildlife and potentially humans.

The research was supported by the Natural Environment Research Council and is now published in the journal *Environmental Health Perspectives*.

The study identified a new group of chemicals that act as 'anti-androgens'. This means that they inhibit the function of the male hormone, testosterone, reducing male fertility. Some of these are contained in medicines, including cancer treatments, pharmaceutical treatments, and pesticides used in agriculture. The research suggests that when they get into the water system, these chemicals may play a pivotal role in causing feminising effects in male fish.

Lead author on the research paper, Dr Susan Jobling at Brunel University's Institute for the Environment said: "We have been working intensively in the field for over ten years. The new research findings illustrate the complexities in unravelling chemical causation of adverse health effects in wildlife populations and re-open the possibility of a human-wildlife connection in which effects seen in wild fish and in humans are caused by similar combinations of chemicals."

"We have identified a new group of chemicals in our study on fish, but do not know where they are coming from. A principal aim of our work is now to identify the source of these pollutants and work with regulators and relevant industry to test the effects of a mixture of these chemicals and the already known environmental oestrogens and help protect our environmental health," she said.

Senior author Prof Charles Tyler of the University of Exeter added: "Our research shows that a much wider range of chemicals than we previously thought is leading to hormone disruption in fish. This means that the pollutants causing these problems are likely to be coming from a wide variety of sources."

New publication on managing water conflicts

A new publication, *Managing and Transforming Water Conflicts*, is available from Cambridge University Press.

Authored by Jerome Priscoli and Aaron Wolf, the publication investigates the dynamics of water conflict and conflict resolution, from the local to the international. They explore the inexorable links between three facets of conflict management and transformation: alternative dispute resolution, public participation and institutional capacity.

For more information, Visit: www.cambridge.org/9780521632164

Australia standardises greywater treatment technologies

CSIRO's Water for a Healthy Country Flagship progamme and the Smart Water Fund (a joint initiative of Melbourne's water businesses and the Victorian government) have developed a practical, robust, sustainable method for testing whether greywater treatment technologies meet Australian standards.

CSIRO Land and Water scientist, Melissa Toifl, explains that the protocol is the first of its kind developed in the country, and could be used to establish a national greywater treatment testing regime. For testing, scientists created a synthetic greywater that contained basic everyday products that people use in the bathroom and laundry.

"We used this synthetic formula and high levels of bacteria, viruses, and protozoa, to test whether a treatment technology under challenged circumstances would produce water that meets the standard described in Australian guidelines for recycled water," reports Toifl.

CSIRO

At present, Australia has no standard national testing method; states and territories each have their own legislation for greywater collection, treatment and use.

"With this protocol we are anticipating a national approach in the way greywater treatment technologies are tested and regulated," says Toifl. "This would simplify the process for manufacturers with the aim of increasing consumer adoption rates."

New digital map of Africa's soils planned

The International Centre for Tropical Agriculture (CIAT) has launched a new project which hopes to produce the first-ever, detailed digital soil map for all 42 countries of the region.

This project, which is made possible by a US$18-million financial injection from the Bill & Melinda Gates Foundation, combines the latest soil science and technology with remote satellite imagery and on-the-ground efforts to analyse thousands of soil samples from remote areas across the continent. The effort is expected to especially assist poor farmers, who suffer from chronically low-yielding crops largely because of degraded soils.

Efforts to improve African soils, which are among the most depleted on earth, have been hampered by a lack of up-to-date, comprehensive knowledge about current soil conditions. This information is critical to identify the types and amounts of mineral and organic nutrient sources needed to increase crop yields.

"Soil management in sub-Saharan Africa must be improved dramatically if we are to reduce poverty, feed growing populations and cope with the impact of climate change on agriculture," said Dr Nteranya Sanginga of CIAT, which is one of 15 centres supported by the Consultative Group on International Agricultural Research (CGIAR). "Achieving this requires accurate, up-to-date information on the state of Africa's soils."

Innovative remote sensing technology will be used via satellite to create detailed images of large areas indicating nutrients, moisture and organic matter in the soil.

Discovery vs disgust – the power of the 'yuck' factor

People often instinctively reject fearsome or repugnant things, especially when those things are unfamiliar.

However, if shared by masses of people, collective repugnance, or the so-called 'yuck' factor, becomes a social force with the power to shape environmental and public policy. For example, numerous wastewater reclamation projects around the world have been derailed following an outcry of disgust among communities. This is despite these technologies being considered a generally safe and cost-effective way to save dwindling water supplies.

According to an article which appeared in international journal *Environmental Health Perspectives* in December 2008, policymakers and scientists need to better understand these gut responses and take them seriously if they are to move certain technologies forward, such as the retreatment of wastewater for drinking and other purposes.

It is argued that, by giving pause to technological progress, the yuck factor opens new opportunities for dialogue between scientists and the public. In some cases, that dialogue might show that a technology's benefits outweigh the repugnance that goes with it. In others, it pushes scientists to make a better case for why a given technology should be pursued at all.

It is important that scientists appeal to this emotion when arguing their case. More often than not this is what determines who wins and loses in science policy debates.
To read the article, Visit: www.ehponline.org/members/2008/116-12/EHP116pa524PDF.PDF