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# Climate Explained: How climate change will affect food production and security

Julian Heyes • 05:00, Dec 04 2019

## The biggest moments in climate change

A look back at some of the biggest climate change moments of the last 12 months. ...

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### Curious about climate change?

Email your questions to [climate.change@stuff.co.nz](mailto:climate.change@stuff.co.nz) and our friends at The Conversation will arrange an answer from an expert.

**According to the United Nations, food shortages are a threat due to climate change. Are food shortages a major threat to New Zealand due to climate change?**

Climate change is altering conditions that sustain food production, with cascading consequences for food security and global economies. [Recent research](#) evaluated the simultaneous impacts of climate change on agriculture and marine fisheries globally.

171 485

### Leaders warn of grave climate consequences on first day of talks

The world must choose hope over surrender in the fight against climate change, U.N. secretary-general Antonio Guterres said on Monday, warning a summit in Madrid that governments risked sleepwalking past a point of no

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## RISKS TO IMPORTED PRODUCTS

New Zealand is a net exporter of dairy, beef, lamb and many fruit and vegetables, but for some products, we depend heavily on imports. [Figures from the US Department of Agriculture](#) are not perfect, but they highlight trade imbalances for major commodities.

New Zealand imports all rice and most of its wheat. It is a net importer of pork products. Horticultural data released annually in [Fresh Facts](#) show New Zealand's major horticultural imports are (in order of value) wine, nuts, processed vegetables, coffee, bananas and table grapes. These imported products come primarily from Australia, China, the US and Ecuador – all countries that may be less [resilient to climate change](#) than New Zealand.

As a [recent report](#) by the UN Food and Agriculture Organisation ([FAO](#)) explains, rising temperatures, rising seas and the increasing frequency of adverse weather events will interact to reduce agricultural and horticultural productivity in many regions around the world. While New Zealand is unlikely to experience food shortages in the near future as a direct result of climate change, the price and availability of imported products may increase significantly.

## FOOD POVERTY

Unfortunately, there is another important consideration. Some New Zealanders already experience food insecurity. The 2008/9 [Adult Nutrition Survey](#) found 14 per cent of New Zealand households reported running out of food often or sometimes due to lack of money.

Perhaps rather than worrying about the future impact of climate change on the price or availability of imported rice or bananas, we should be paying more attention to this social inequity.

As a wealthy agricultural nation and a net exporter of food, it does not seem right that one sector of our society is already regularly experiencing food shortages.

Professor Julian Heyes is the Head of School of Food and Advanced Technology

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## OVERCOMING DOMESTIC CHALLENGES

As residents of a developed country, we are accustomed to accessing the world's resources through supermarkets. New Zealanders take for granted that most foods (even those we do not produce, like rice or bananas) will be available all year round.

Asparagus, new potatoes and strawberries are examples of foods New Zealanders may expect to see only at particular times of the year, but if apples or kiwifruit are out of stock, people usually complain. Our expectations are based on imports of products when they are out of season in New Zealand. The availability of those imports may be seriously compromised by climate change.

A recent [Ministry for the Environment report](#) describes climate impacts, including detailed projections of the average temperature increase and changes in rainfall patterns across New Zealand. The consistent trends are towards wetter conditions in the west, drier in the east and the largest average temperature rises in the north.

[Implications for agriculture](#) are manifold. For example, many temperate crops require cool autumn or winter temperatures to initiate flowering or fruit ripening. Orchards may need to be relocated further south, or novel [low-chill varieties](#) may need to be bred, as is already happening around the world.

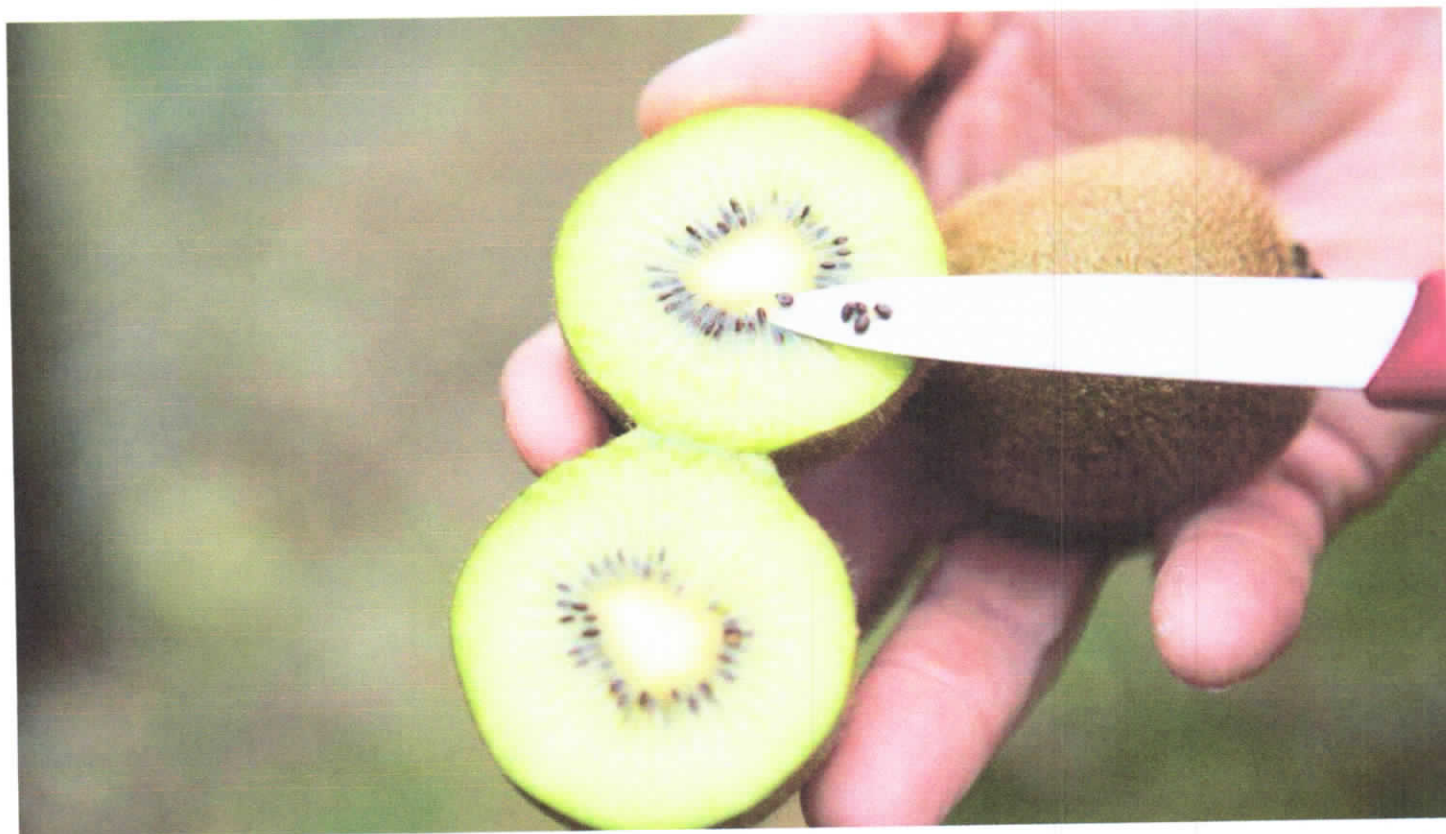
Insect pests and diseases are normally controlled by our low winter temperatures, but they may become more of a problem in the future. [Introduced pests and diseases](#) include fruit flies that have a major impact in Australia and other more tropical countries, but struggle to establish breeding colonies in New Zealand. Strong biosecurity controls are our best bet for reducing this risk.

What matters more than the gradual increase in temperature predicted by climate change models, is the greater frequency of extreme weather events. These include droughts, floods and hail, which can lead to total crop losses in particular regions.

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- \* [Pine trees aren't the answer to carbon mitigation](#)
- \* [Climate explained: Why coastal floods are becoming more frequent as seas rise](#)
- \* [Climate Explained: How much does flying contribute to climate change?](#)
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Modelling of those impacts under a business-as-usual carbon emission scenario suggested about 90 per cent of the world's population – most of whom live in the least developed countries – will experience reductions in food production this century.



TOM LEE/STUFF

Many temperate crops require winter chilling to initiate flowering or fruit ripening, and orchards may need to shift to colder areas.

New Zealanders are fortunate to live in a part of the world blessed with relatively fertile soils, adequate water supplies and mild temperatures. This gives us a comparative advantage for agriculture and horticulture over many other countries, including our main trading partner, Australia.

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## ECan candidate Dr Elizabeth McKenzie warns of sea level rises

Matthew Littlewood • 15:46, Aug 20 2019



SUPPLIED

Scientific researcher Dr Elizabeth McKenzie is running for ECan council.

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Canterbury seat in this year's local government elections, running alongside Herstatt Ulrich, Peter Scott, Peter McIlraith, Dr Phil Driver and Jared Ross.

She said her background in the sciences, including a Master's degree in geology, means she would be prepared for a role in ECan, where there is a lot of focus on science and reports.

"From a practical point of view, if I need to assess long technical reports, I don't have a problem with that. If anything, my scientific training enables me to spot what might be errors and omissions," McKenzie said.

**READ MORE:**

- \* [Waitaki farmer Jared Ross joins Environment Canterbury council race](#)
- \* [Dr Phil Driver wants ECan to deal with the 'hard issues' on protecting the environment](#)

"I've got a good solid background in scientific research. I've got an opportunity to do something in the local government sphere that helps other people," she said.

McKenzie, who moved to Fairlie from Auckland earlier this year, said her biggest concerns were sea level rises, air quality and water quality.

"Coastal towns like Timaru really need to be prepared for the dramatic sea level rises over the next few decades. It means we have to improve our long-term planning, and come to terms with the fact that important infrastructure and facilities will have to be moved further inland," she said.

"We've seen that issue recently with Patiti Point. Some people might say I'm being alarmist but the evidence is right in front of us."

Timaru's air quality was also a concern and she would also like to see a stronger focus on concerns about nitrate levels in waterways.

"It's a health issue as much as an environment one. Our way of life is killing us and we need to do something for the sake of our children's future. It's a big deal," McKenzie said.

She was also concerned about the economy's increasing reliance on dairying.

"I'm concerned we're putting all our eggs, or cows in this case, into one basket at a time of increasing geopolitical instability," McKenzie said.

"We need to put in structures that support economic diversification. We need to be far more self-sufficient."

# Drone captures Oamaru's coastal erosion

Lee Jamieson • 14:53, Oct 01 2015



1 OF 3

LEE JAMIESON/FAIRFAX NZ

A drone surveying coastal erosion along the roads on the east coast of Oamaru for the Waitaki District Council, is operated by Fulton Hogan Dr Sean Connaughton and pilot Hunter Burt, of Dunedin

The Waitaki District Council will be using a drone to photograph erosion caused by the sea alongside the roads on the East Coast of Oamaru every six months to a year.

A drone was used for the first time on Tuesday to photograph the coast and identify weak points on the road side of Beach Rd from the Waianakarua River to the Oamaru Golf Course. Weather permitting an area in Oamaru would be surveyed the following day along the breakwater and wharf then the coastline to Redcastle Rd.

Waitaki District Council senior roading engineer Graeme Butler said it had been "virtually impossible" for anyone to assess some of the areas because of safety reasons.



LEE JAMIESON/FAIRFAX NZ

A drone being used to survey coastal erosion near the roads on the East Coast of Oamaru by the Waitaki District Council, left, senior roading engineer Graeme Butler and roading manager Michael Voss with Fulton Hogan pilot Hunter Burt, back left, and laboratory manager Dr Sean Connaughton, of Dunedin,

"We've been down here after high sea events ... it's been quite scary to watch the force of the sea and the undercuts the sea is running under," Butler said

Roading manager Michael Voss said up to two and a half metres of coastal erosion in the region happened every year and if a "storm gets ferocious" it was "beyond our control" the damage it could do to the roads at any time.

The frequency of using a drone for information would depend on storm activity and the conditions of the sea, but it would be done at least annually during the low tide along the shoreline and if necessary through the road up to 40m in width, he said.

One of the main reasons the council had decided to use a drone was because of a dangerous slip that had reduced the road to one lane near the entrance to Kakanui before Fortification Rd.

"Some of this doesn't happen until we get another big storm," Voss said.

"This is the environment we're in theoretically, because of the new climate change with increasing storm intensity. We've been monitoring these areas for quite a few years, obviously we've had these weak points, it's been ongoing for 15 to 20 years."

cover a distance of 8.6 kilometres.

Costs were about \$3000 so it was a very effective and safe way of collecting the information which would be available in about a weeks time, Voss said.

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# SETTING RESEARCH PRIORITIES FOR IMPACTS OF CLIMATE CHANGE ON DROUGHT

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ACTION=VIEW&STORY\_ID=782)

As part of the government funded science challenges, Water New Zealand has been invited to participate in "Deep South Science Challenge (<http://www.deepsouthchallenge.co.nz/>)" dialogue on drought. The outcomes of the dialogue will be funded research projects that look at the Impacts and Implications of climate projections of drought.

Impacts and Implications projects will build on improved understanding of future climate and existing initiatives developed by NIWA;

- A drought monitor system for keeping track of drought conditions across New Zealand (<https://www.niwa.co.nz/climate/information-and-resources/drought-monitor>)
- Potential evapotranspiration deficit (PED) projections available in Section 3.8 of the Ministry for Environment Climate Change Projections for New Zealand (<https://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/nz-climate-change-projections-final.pdf>)

Scientists noted that projections of soil moisture and drought remain relatively uncertain compared to other aspects of the water cycle. Nonetheless, a major message is that drought severity increases over time, and the extent will be influenced by the extent of future greenhouse gas emissions. Key takeaways from NIWA were:

- **Drought risk is expected to increase this century in already drought-prone areas,**
- **'Severe droughts' occur more often by mid and late-century** and worsen as greenhouse gas forcing increases
- **Low flow conditions are expected to be reached earlier in the water year for much of the North Island and eastern South Island,** increasingly so with higher radiative forcing scenarios and towards the end of the century (except the West Coast)
- **Summer Mean conditions during spring, summer and autumn seasons are expected to remain about the same or become slightly wetter** by mid-century for the lowest radiative forcing scenario. With increased radiative forcing and time, soil moisture conditions are expected to become drier in the North Island and in South Canterbury, Otago and Southland.
- **Soil Moisture Deficit conditions during summer are expected to remain about the same or become slightly lower by mid-century.** With increased radiative forcing and time, soil moisture deficit conditions are expected to increase in the North Island while reducing in South Canterbury, Otago and Southland.
- **Less stream water will be available during summer months,** and that there is likely a potential reduction of agricultural/plant water needs in the summer months in South Island versus an increase in the North Island.

The projects will complement existing water related research projects being undertake as part of the challenge;

- Impact of climate change on New Zealand's frozen water resources (A Mackintosh) (<http://www.deepsouthchallenge.co.nz/projects/snow-ice-and-glaciers-our-changing-climate>)
- Robust adaptation decision-making under uncertainty in the water sector (A Wreford) (<http://www.deepsouthchallenge.co.nz/projects/making-robust-decisions-about-new-zealands-water>)
- National hydrological and water resource impacts of climate change (C Zammit) (<http://www.deepsouthchallenge.co.nz/projects/climate-impacts-national-water-cycle>)
- Drinking water in Te Hika o te Iku (Northland) (W Henwood) (<http://www.deepsouthchallenge.co.nz/projects/drinking-water-te-hiku-o-te-ika>)

Members with an interest in existing research streams, or feedback on research priorities for the upcoming funding round should contact: [Lesley.smith@waternz.org.nz](mailto:Lesley.smith@waternz.org.nz). (<mailto:Lesley.smith@waternz.org.nz>) Priorities for future research will be developed at a workshop on 12th June.