

El Niño: don't scare the cows

This summer will be a scorcher. MetService is forecasting the most severe El Niño in over 20 years. Past El Niño events have hit farmers hard and tipped New Zealand into recession. But farming today is not the farming of yesteryear and we need to examine local conditions one region at a time to understand the likely impacts. Even under a severe event, recession is far from pre-ordained. Key commodity prices could even lift a little.

El Niño – an ill wind...

When it comes to the accuracy of forecasting, meteorologists put economists to shame. So when the MetService say the following, we listen:

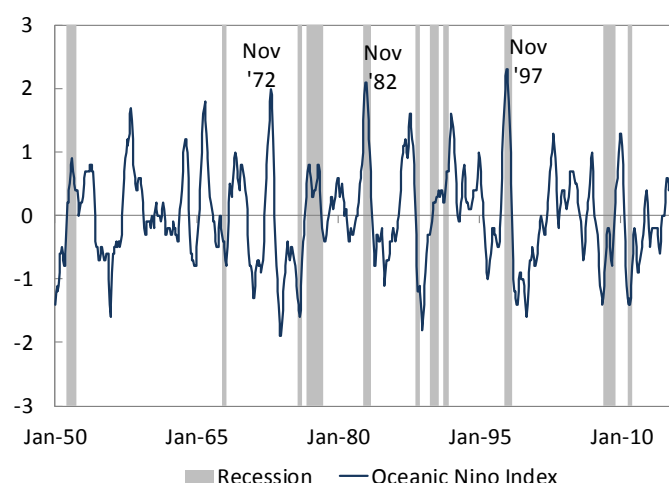
The current state of the ocean-atmosphere in the Pacific and the international consensus forecast suggest that this event could then rank amongst the 4 strongest El Niño events recorded (along with 1972/73, 1982/83 and 1997/98).

This summer, expect a number of newspapers to run photos of farmers standing in dry, bare paddocks. Severe El Niño events can generate recessions (see Figure 1).¹ But so do many other events (such as the Asian financial crisis), and not every El Niño event generates a recession.

Figure 2 tracks the path of GDP after the three most severe El Niño events since 1950. It shows short-run decreases in output following severe events in November of 1982 and 1997. But other factors generated strong output growth after 1972/73.^{2,3} So knowing whether a severe El Niño event will be sufficient to generate a recession this summer requires digging a little deeper.

Figure 1 El Niño can generate recessions

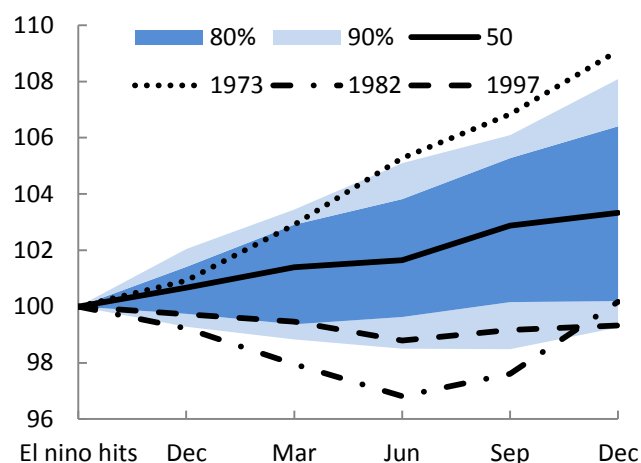
Oceanic Niño Index, higher values indicate hotter conditions



Source: GDP: Hall and McDermott (2011), ONI: National Oceanic and Atmospheric Administration, NZIER calculations

Figure 2 Recession is not pre-ordained

GDP after El Niño compared to no event confidence intervals



Source: GDP: Hall and McDermott (2011), ONI: National Oceanic and Atmospheric Administration, NZIER calculations

¹ El Niño is a set of warm conditions in the central Pacific that brings dry conditions to the east of New Zealand and rain to the west, reducing agricultural production. We use the Oceanic Niño Index (see [National Weather Service Climate Prediction Center](#)) to track these conditions.

² We use Hall and McDermott (2011) post-war estimates of real GDP to track GDP after El Niño events that build from September and often peak in November. The confidence intervals show the path of GDP since 1950, excluding El Niño years.

³ 1972/73 was consistent with drought but commodity prices shifted significantly higher and government spending increased through the period.

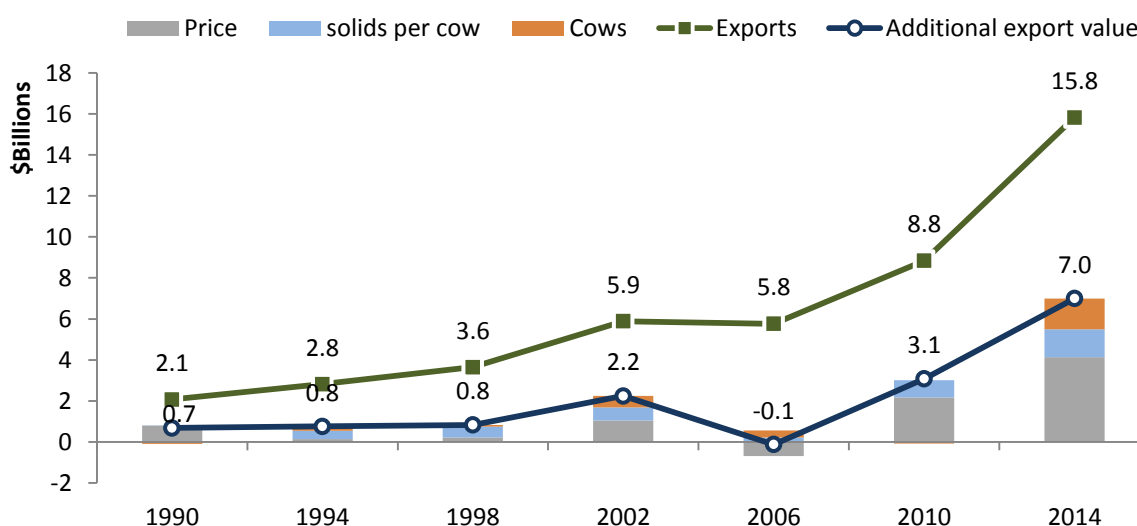
Farming today is not farming of yesteryear

Today farming is much different to farming practices in 1972/73, 1983/83 and even 1997/98. While the share of agriculture in the economy is roughly similar, today’s farming practices are much different and have shifted towards dairy and away from sheep and beef in response to strong dairy prices.

Farming practices are also more efficient – grinding out more value from each animal from improved genetics and farm management, particularly for sheep and dairy.⁴ Figure 3 shows a combination of better prices, more production from each dairy cow and an increase in the number of cows drove a \$7 billion increase in the value of dairy exports to \$15.8 billion in 2014.

Figure 3 Better prices, productivity gains and more cows have lifted dairy exports

Export growth decomposition, nominal



Source: DairyNZ, NZIER calculations

Land used for dairying has risen to 1.1m hectares in 2013/14 in the North Island, and 0.6m hectares in the South Island. Some growth is on relatively marginal land for production but land under irrigation has also increased. In 2012 there were about 720,000 hectares of land under irrigation across all agricultural sectors.⁵

Irrigation also makes a material difference to resilience, mitigating the extent to which warm El Niño conditions are translated into drought. Farmers today are also more likely to be creative in dealing with drought - they can see it coming and use alternative feed practices and shift stock around to reduce exposure to dry conditions.

Farming practices can also generate bumps along the way. Culling tends to increase in drier conditions when farmers reduce stock to balance available feed. This can produce a short bump up in agricultural production but followed by declining exports at later periods.⁶ Milk production increased in most years since 1992/93, but dropped markedly due to the droughts in 1997/98, 2007/08 and 2012/13. Overall, in drought years milk production decreases and meat production increases. In the post drought year, milk production recovers and meat production falls.

⁴ Since 1990, the sheep flock has almost halved but efficient farm management and genetics mean the tonnage of lamb for export is roughly flat, even though much prime sheep country is now used for dairying.

⁵ A recent report by NZIER estimated the net farm gate impact of irrigation increased from \$0.92 billion in 2002/03 to \$2.17 billion in 2011/12, from a combination of better margins and expansion in the land under irrigation.

⁶ Buckle et al. (2002) focus on the impact of drought as measured by soil moisture deficit across the country. They show that two quarters after a drought there is “an immediate and significant fall in output” and note that “export volumes increase contemporaneously with the climate shock... reflect(ing) an increase in the slaughter rate by farmers in response to unexpected drier climatic conditions”.

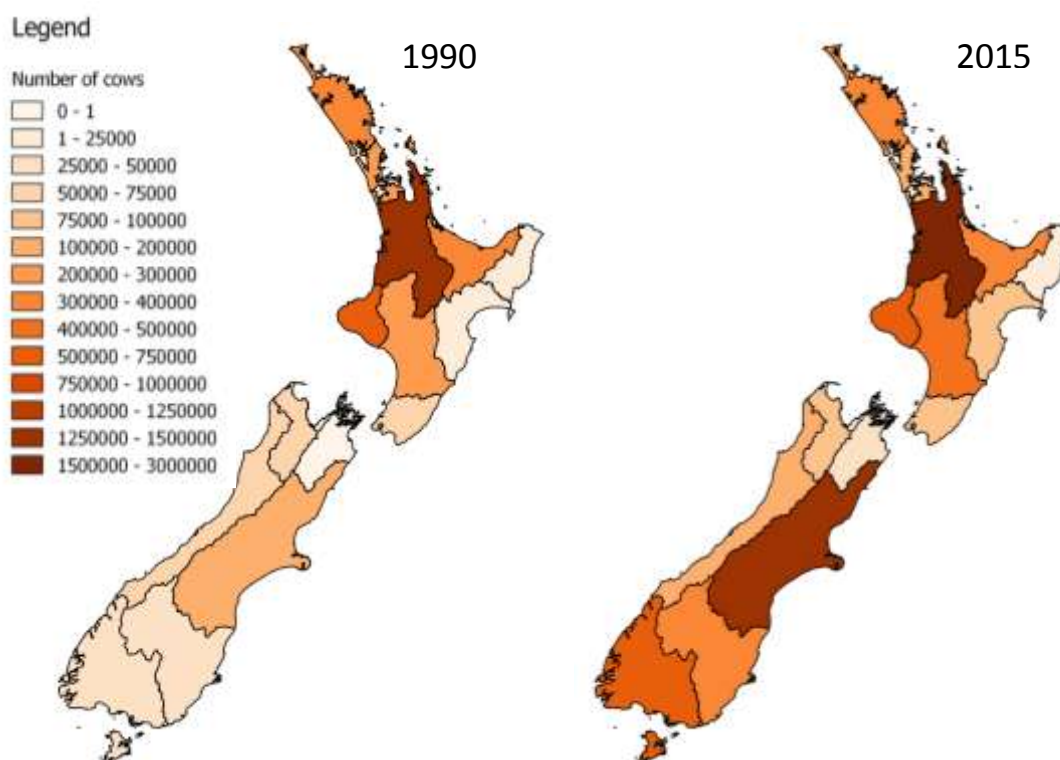
The relatives matter

The impact will also depend on whether El Niño affects all of New Zealand, or just certain regions. To an extent, farmers can sell livestock into areas which may have less of a concern with drought, and buy feed from farmers who aren't affected so much. Existing Reserve Bank research does a nice job of showing the importance of just where the drought occurs. It points to a net impact of 0.3 percent of GDP from the 2013 drought, but an event that has a larger impact on the North Island could generate a 0.7 percent impact on GDP.⁷

The location of dairy has shifted markedly over the past 25 years, shifting towards Southland and Canterbury for example (see Figure 5). Precisely how – and where – hot and dry El Niño conditions manifest in local drought conditions will therefore determine the magnitude of the impact that flows through to the national economy.

Figure 4 Many more regions have material dairy exposure than a generation ago

Dairy cattle, June years, 1990 vs 2015



Source: Statistics New Zealand

But perhaps most important is the relative impact of El Niño not within New Zealand but across the globe. If many of our competitors are also adversely affected by El Niño then we would expect some offsetting impact of commodity prices being pushed higher by a lack of supply of dairy, although higher supplies of meat may push some commodity prices lower.

Typically, El Niño conditions hammer Australia and New Zealand but favour the US and euro area and lift growth in these areas (see Cashin, Mohaddes and Raissi 2015). Overall, Kamber, McDonald and Price (2013) suggest that world dairy prices were about 10 percent higher in 2013 from the drought conditions observed in New Zealand that season.

⁷ See Kamber, McDonald and Price (2013). NIWA (2013) show that the 2013 drought primarily impacted southern Northland, Auckland, Waikato, Bay of Plenty, the central North Island, Gisborne, Hawkes Bay, Wairarapa and part of the north and west of the South Island.

Monitor to assess likely impacts

Farmers will know their local conditions better than anyone. But at a national level, to minimise disruptions and mitigate the impacts, policymakers should listen to rural networks and will need to track:

- Widely available indices, such as the Oceanic Niño Index that tracks evolving climate conditions which have been associated with drought in the New Zealand in the past.
- Soil moisture deficit readings to track relative differences in drought conditions across New Zealand. Right now New Zealand has had a wet, wet winter and much of New Zealand is at moisture capacity.
- Changes in slaughter rates if drought conditions become well advanced.
- Drought conditions in the economies of competing agricultural producers.

A drought will hurt but farmers have developed a range of options to deal with these events. At a national level, if required, monetary policy will play a role, lowering interest rates and depreciating the NZ dollar. A material El Niño would knock agricultural GDP, but a recession is far from inevitable.

References

- Buckle, Robert A, Kunhong Kim, Heather Kirkham, Nathan McLellan and Jared Sharma, (2002), "A structural VAR model of the New Zealand business cycle", *Treasury Working Paper Series 02/26*, New Zealand Treasury.
- Cashin, Paul, Kamiar Mohaddes and Mehdi Raissi, (2015), "Fair weather or foul? The macroeconomic effects of El Niño", *IMF Working Papers 15/89*, International Monetary Fund.
- DairyNZ and LIC, (2014), *New Zealand Dairy Statistics 2013-14*, Livestock Improvement Corporation Limited and DairyNZ Limited.
- Hall, Viv B. and C. John McDermott, (2011), "A quarterly post-Second World War real GDP series for New Zealand", *New Zealand Economic Papers*, Taylor & Francis Journals, vol. 45(3), pages 273-298, March.
- Kamber, Gunes, Chris McDonald and Gael Price, (2013), "Drying out: Investigating the economic effects of drought in New Zealand" *Reserve Bank of New Zealand Analytical Notes AN2013/02*, June.
- MetService, (2015), *Seasonal climate outlook: September - November 2015*, issued 3 September, <https://www.niwa.co.nz/climate/sco/seasonal-climate-outlook-september-november-2015>.
- NIWA (2013), "The 2012-13 drought: An assessment and historical perspective", *MPI Technical Paper No: 2012/18* Prepared for the Ministry for Primary Industries by NIWA, ISBN No: 978-0-478-41494-3 (online), ISSN No: 2253-3923 (online), June.
- NZIER and AgFirst Consultants NZ Ltd (2014), "Value of irrigation in New Zealand: An economy-wide assessment", Report to the Ministry for Primary Industries, 17 November.

This Insight was written by Dr Kirdan Lees and Geoff Parr at NZIER, 21 September 2015

For further information please contact Kirdan Lees: kirdan.lees@nzier.org.nz or 021 264 7336

NZIER | (04) 472 1880 | econ@nzier.org.nz | PO Box 3479 Wellington

NZIER Insights are short notes designed to stimulate discussion on topical issues or to illustrate frameworks available for analysing economic problems. They are produced by NZIER as part of its self-funded Public Good research programme. NZIER is an independent non-profit organisation, founded in 1958, that uses applied economic analysis to provide business and policy advice to clients in the public and private sectors.

While NZIER will use all reasonable endeavours in undertaking contract research and producing reports to ensure the information is as accurate as practicable, the Institute, its contributors, employees, and Board shall not be liable (whether in contract, tort (including negligence), equity or on any other basis) for any loss or damage sustained by any person relying on such work whatever the cause of such loss or damage.