

Agriculture appears to have turned the corner, but what about the weather, water and world demand?

Australian and New Zealand farming 'agribusinesses' produce grain, meat, wool, milk, wine, fruit and more. Closely associated with them are the producers and distributors of seed, chemicals, fertilisers, cropping services and other essential inputs, plus the downstream manufacturing industries that produce food, beverages, wood, paper, textiles and other products.

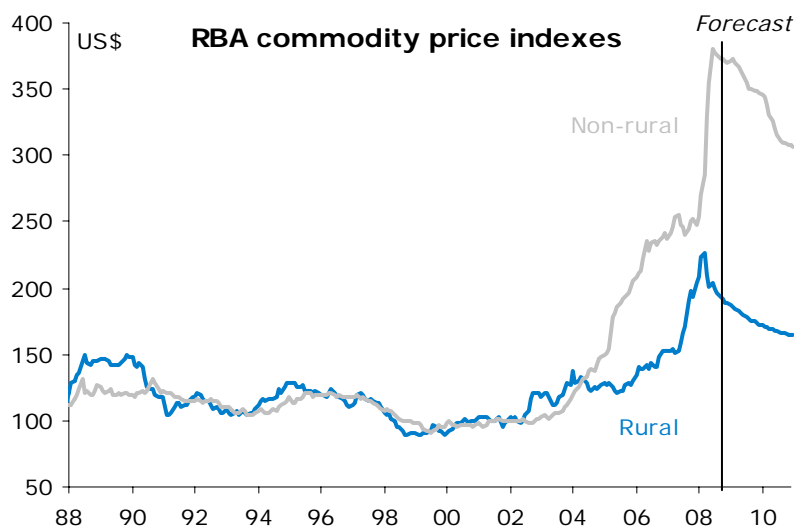
Key points

Australasian agricultural producers are resilient and adaptable, but they currently face many challenges, locally and globally. Agriculture is inherently cyclical. Australian agriculture is currently entering the upward, expansionary phase of a cycle, with national production increasing as some parts of the country emerge from drought and world markets show a keen interest in food commodities. Australian farms are, on average, well-placed to take advantage of this potentially risky recovery phase. New Zealand producers are currently shifting from sheep and beef into more dairy production, in response to strong global demand and prices. After several difficult years, the outlook for fresh dairy exporters is rosy.

Global agricultural commodity prices recently reached record levels due to strong demand, rising prices for fuel, fertiliser and other essential inputs, and supply disruptions (including drought in Australia and elsewhere). Prices for many agricultural commodities are now easing as production catches up again. Agricultural-related investment products are currently finding favour with global investors seeking a more profitable alternative to shaky equity markets, high-priced property and hot hard commodities.

Looking forward, water is the key. In the longer-term, climate change is expected to disrupt global agricultural production. Climate research indicates a hotter, drier, less productive future for Australia's intensively farmed southeast. Regions to the north of Australia and in New Zealand may fare better in terms of rainfall, but are warming up also. Global demand for agricultural produce however, is unlikely to ease up.

Rural commodities followed non-rurals up, but are now easing



Source: RBA, ANZ Economics and markets research

16 July 2008

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For Economics & Markets Research to be the most respected, sought-after and commercially valued source of economics and markets research and information on Australia, New Zealand, the Pacific and Asia.

How big is Australian agriculture?

In 2007, Australian agriculture* produced:

- 21 mn hectares of crops
- 85mn sheep and 28 mn cattle
- \$44,663 mn in gross production
- \$20,317 mn in gross value added
- 2.0% of GDP, by gross value added
- \$23,697 mn in exports, by value
- 10.9% of exports, by value
- 306,000 jobs.

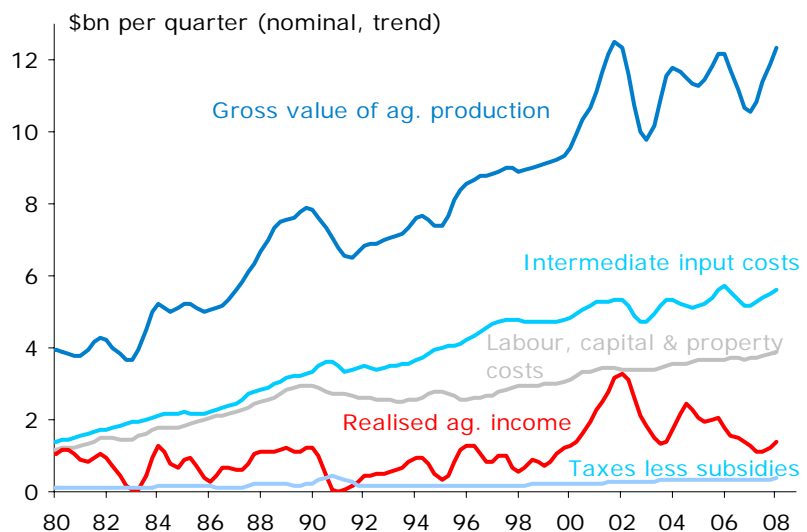
* not including forestry, fishing, agricultural services or downstream processing.
Sources: ABS (trend), ABARE.

Australian agriculture production cycles

Australian agriculture is just emerging from a long, widespread drought, in which farm production, exports, incomes and employment dropped significantly in 2003 and again in 2007. Production, employment and incomes hit their troughs in late 2007, and have since been trending up. In 2007, gross agricultural production was worth \$44bn and exports were worth \$23bn, with production in the lowest quarter, March, worth 13.7% less than a year earlier. By the march quarter of 2008, the combination high rural commodity prices and recovering production meant the gross value of agricultural production reached its highest level since the peak of March 2002 (in nominal, trend terms), and a full 17.2% more than a year earlier. This turnaround indicates just how fast and how steep the cycles in agricultural production and earnings can be.

Agricultural incomes however, typically take longer to recover from drought than does production. This is part of the pattern normally seen following a drought, because the cost of re-stocking or planting a new crop must be met well before the income from the new season rolls in. During this phase, agricultural debt typically goes up temporarily, in order to meet higher operating costs, as well as all the ongoing fixed capital costs of running an active agricultural business. In 2008 however, rising prices for many of the inputs essential to gearing up production again — including fuel, fertiliser, chemicals and labour — have meant that incomes are likely to take longer than normal to recover. Even so, ABARE's annual farm survey indicates average farm business profits and rates of return are expected to be positive again in 2007-08, after two years of negative profits.

Aggregate farm production and incomes are now trending up again



Source: ABS

Naturally, these national averages hide wide variations across individual businesses and regions. Even in 2007-08, ABARE estimates 62% of all farm businesses will have a negative business profit (down from 79% in 2006-07) and 30% will have a negative cash income (down from 42% in 2006-07). Broadacre farms that are able to bring in a decent harvest will do very well this year, with wheat and other grain prices near the top of the market. Similarly cattle graziers in the far north largely escaped the drought and have benefited from low breeding livestock prices to the south and solid export earnings.

The Australian Government assists agribusinesses through the seasonal cycles with a number of programs, including the giant Farm Management Deposits Scheme, which gives tax breaks to farm businesses that can save in the good years and then draw down on those savings in the lean ones. At 31 March 2008, 41,024 farm businesses held Farm Deposits worth a total of \$2,330 mn. Unsurprisingly, deposit-holders have drawn down on their savings in this scheme in 3 of the last 5 quarters, including in the last two (Dec 2007 and March 2008).

Even after prolonged drought, Australian farms hold \$2.3bn in tax-effective Farm Management Deposits.

Australia's system of national farm drought assistance is currently under review.

Agricultural businesses are resilient survivors and adapters.

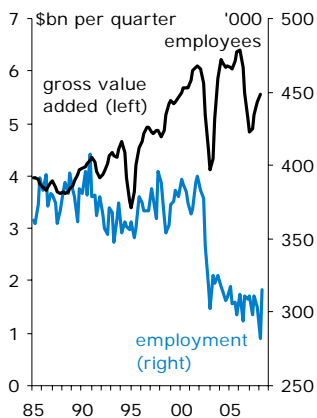
Despite the drought, agricultural investment levels have been solid.

Landholdings have consolidated, improving economies of scale.

Total factor productivity has headed up ...

... as has labour productivity.

Agriculture's productivity gains: real gross value added trends up, employment trends down



But with production now increasing again, the industry faces labour shortages.

The Government also provides income and other assistance to farms and related small businesses in drought-declared areas of 'exceptional circumstances'. At its worst, almost all of Australia's agricultural regions were drought-declared for government assistance purposes during the most recent phase of this drought. Some regions in NSW and Queensland have now been drought-declared for assistance purposes for five years and more. Australia's state governments also provide assistance under separate schemes. A three-stage inquiry into national drought assistance is currently underway, examining its environmental, economic and social aspects in the context of likely future climate change.

Although difficult for businesses and communities at the time, lean years can bring long-term benefits to an industry and/or region in the form of business adaptation, rationalisation and efficiency gains. Somewhat surprisingly, Australian agriculture (defined more broadly as agriculture, forestry and fishing) had a relatively high business survival rate during the drought years of 2003 to 2007, with 64.8% of the 212,005 agricultural businesses operating in June 2003 surviving to June 2007, compared with 61% of manufacturing, 55% of retail and 57% of construction businesses that survived for all of the same period.

Despite the drought, farm investment in plant, machinery, equipment, vehicles and land expansion remained higher through the 2000's than a decade earlier (in real terms). Land acquisition has been important through this period, with the average scale of production (as measured by cropping areas) increasing by an estimated 58% since the 1980s. Farm debt has increased also, in order to fund this investment and in order to fund working capital requirements through the drought (sources of farm debt are discussed further below). Rising land values however, have seen average farm equity maintained, at around 85% of farm value, for broadacre and dairy farms. This increase in investment without a consequent deterioration in debt ratios augurs well for drought recovery.

Total factor productivity growth in Australian agriculture is highly variable from year to year, but long-term estimates indicate steady improvement of around 1.5% per year (average for 1977-78 to 2005-06) for broadacre and dairy farms. Productivity gains have been highest in graincropping (2.3% annual average gains) and lower in the beef, dairy and sheep sectors (1.4%, 1.2% and 0.3% annual average gains). Low productivity growth in sheepfarming has seen this sector shrink, with businesses switching to other sectors such as beef and grain.

National agricultural employment has been falling for some time due to drought. It dropped from a recent peak of 392,000 in 2001 to 318,000 in 2002 and has hovered around 310,000 since mid-2004. February 2008 saw a new low of 282,000 employees. ABS estimates indicate that agricultural labour productivity more than doubled between 1985-86 and 2005-06. Indeed, it was one of the better performing industries on this measure over this period. Even so, the end of the drought in many areas means labour demand is rising again. But with national labour shortages rampant, agribusiness employers in many regions are likely to find it tough to attract workers from more lucrative jobs elsewhere.

Selected agricultural commodities, Australian annual production

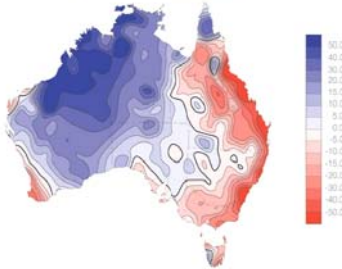
Kilotonnes (kt)	2005-06	2006-07	2007-08f	2008-09f
- Wheat	25,150	10,822	13,039	23,680
Total grains & oilseeds	44,798	20,715	25,680	40,132
Cotton (lint)	597	274	126	428
Sugar (cane for crushing)	37,128	36,397	36,752	36,507
Beef & veal meat	2,077	2,226	2,160	2,135
Lamb & mutton meat	626	684	690	603
Poultry meat	817	855	846	860
Wool	510	477	452	443
Milk (ML)	10,089	9,583	9,100	9,250

Source: ABARE, *Commodities Quarterly*, June 2008.

Australian agriculture's demand for water

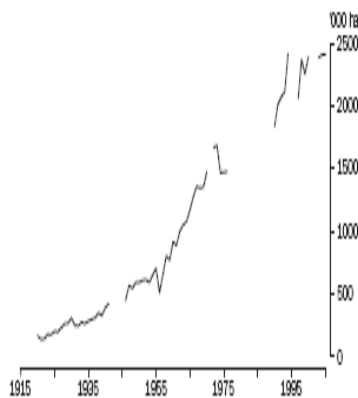
Australia's rainfall has been shifting north for some time

Trend in annual total rainfall 1950 – 2003 (mm/10 yrs)
Source: Bureau of Meteorology, 2004



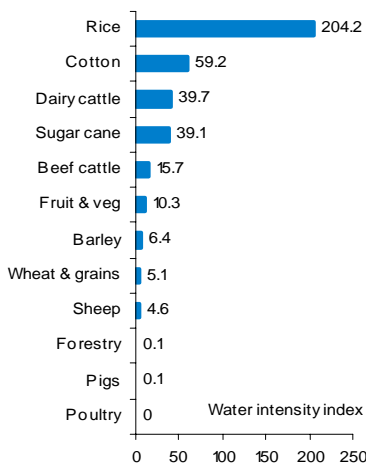
Source: Bureau of Meteorology

2.5 mn hectares of Australian farmland is now irrigated



Source: ABS 4610.0, *Water Account 2004-05*.

Some agricultural products are more vulnerable to water shortages than others



Source: CSIRO and University of Sydney 2006, *Balancing Act*.

While Australian farm finances might be well-placed to recover from drought in 2008, their water supplies are not. Indeed, reliable access to water is the single biggest threat facing Australian agriculture, immediately and in the longer term. This issue is not new. Even before the most recent drought, Australia's rainfall patterns were changing, with the southeast generally getting drier and the north becoming wetter than in the past. Over the second half of the 20th century for example, average annual rainfall shrank by up to 50% in some areas by 2003, when compared to the relatively wetter (and colder) 1950s. Agriculture has had to constantly adapt, with new crops, methods and technologies over that period.

In total, agriculture takes two-thirds of Australia's total water consumption. Much of this water is supplied via irrigation, a tried and true technology that is now several thousand years old. In Australia over the last 50 years, there has been a five-fold increase in the total land area supplied by irrigation, from less than 500,000 ha in 1955 to almost 2.5 mn ha in 2005 (see graph left). Irrigation methods have become more water-efficient over the years, however 62% of all irrigated land was still being surface irrigated (that is, controlled flooding of paddocks and fields) in 2004-05, rather than using a more water-efficient drip system (9% of irrigated land) or a sprinkler system (28%). Important efficiency improvements in irrigation infrastructure and methods are gradually occurring, with federal and state government funding programs allocated to the problem.

Irrigation is used to produce some of Australia's most valuable crops. The Business Council of Australia has estimated that "half of Australia's agricultural value is produced using 12% of our irrigated water supplies". Around 70% of all irrigated production draws water from the Murray-Darling river system, which is currently experiencing record low water inflow levels due to ongoing drought. The Murray-Darling's health is hence crucial to Australian agriculture. After many years of debate, Federal agreement has now been reached on a National Water Initiative for it, including a single Murray-Darling management authority and urgent water management reform. The Murray-Darling's plight has prompted loud calls for more urgent and radical national water reform and even for the relocation of some irrigation agriculture activities to wetter regions to the north.¹

Water consumption in agriculture reflects the size of each crop as well as the water intensity of different agricultural products — that is, the amount of water needed to produce a given value of output. Thus in 2004-05, dairy farming consumed the most water (18.7% of all agricultural water consumption) but rice was the single most water-intensive product, relative to the value of its output. In contrast, Australia's more traditional and widespread broadacre crops (primarily wheat) and livestock grazing use relatively low amounts of water in proportion to the value of their output. On the other hand, they tend to require a greater area of land and/or other resources to support production. Grain-fed cattle, poultry and pig production also have low 'water intensity' scores, due to intensive indoor production processes that rely on commercial feed supplies and other inputs rather than on the vagaries of the local weather. Again, their costs are much higher for other essential inputs (such as feedstock and energy).

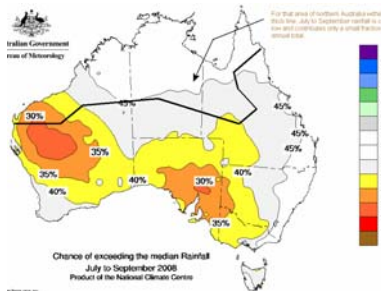
Products that require more water are generally produced in naturally wetter regions (e.g. sugar in Qld and dairy in Victoria and Tasmania) or in low-cost irrigation regions (e.g. cotton and rice in some Murray-Darling irrigation zones). The water intensity of each sector will vary from year to year, depending on net water consumption, production yields and product prices, such that it may be worth planting a crop in some years, but not in others. Water intensity can be improved through various technologies and farming techniques, but significant differences across sectors will always exist, due to the natural water requirements of each crop or product. In terms of future business risk, this leaves some agricultural crops and products much more vulnerable to reduced water supplies and/or higher water costs than others.

¹ Business Council of Australia 2006, *Water Under Pressure*; Agriculture and Food Policy Reference Group 2006.

Australian water, weather and climate

Most of Australia's main agricultural regions remain drought-declared for federal government assistance purposes.

Winter 2008 is looking dry



Source: BOM

By 2040 every second year will be 'exceptionally hot', and 'exceptionally dry' years will occur twice as often and affect double the land area.

Average annual temperature change from 1990:

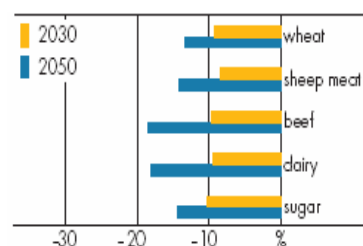
2030: +1.0°
2050: +0.8° - +2.8°
2070: +1.0° - +5.0°

Average annual rainfall change from 1990:

	north	south
2030:	-10-+5	-10-0
2050:	-20-+10	-20-0
2070:	-30-+20	-30-+5

Source: CSIRO and BOM, 2007 and 2008.

Based on these climate change numbers, agricultural production is expected to drop 10% below its potential

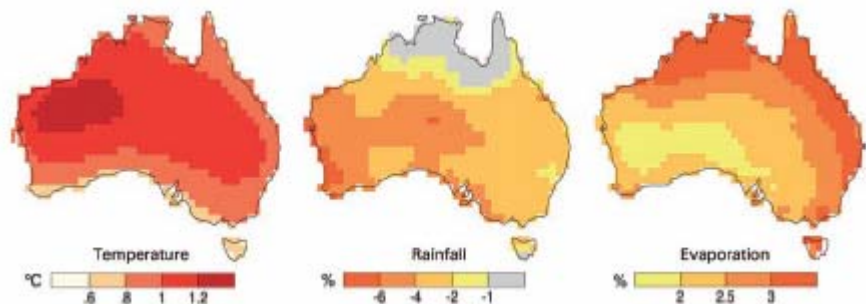


Source: ABARE 2007.

Looking forward, the outlook for Australian agribusinesses is complicated by uncertain — and in some locations, downright unfavourable — weather and climate forecasts. In the short-term, the long drought has never really ended for the Murray-Darling Basin; its rivers are not yet flowing again and the irrigation allocations essential to many Basin agribusinesses are not yet restored. Elsewhere, Federal 'exceptional circumstances' drought assistance is still available across almost all regions of Victoria, South Australia and NSW, as well as much of Western Australia, southern Queensland and eastern Tasmania. Unfortunately, the remainder of winter 2008 (July to September) is expected to bring lower than average rainfalls nationally, with parts of South Australia and Western Australia rated as having only a 30% chance of above average rainfall.

In the longer term, the climate outlook will require a wide range of adaptations by agriculture, including possible relocations and exits from the industry. Climate change will affect national and local rainfall, temperature and soil moisture content. The latest research by CSIRO and BOM into 'exceptional' weather looks grim, particularly for Victoria, Tasmania and Western Australia. CSIRO and BOM conclude that "the intensity and frequency of exceptionally hot years have been increasing rapidly over recent decades and this trend is expected to continue", with 'high temperature' years occurring every 1-2 years by 2040, instead of only once every 22 years during the 20th century. For Western Australia, higher temperatures and lower rainfall will be the main risks for farmers, while in Victoria and Tasmania, rising evaporation rates are likely. These changes will require different responses from farmers in each area, but all locations will need to focus on water conservation and efficient allocation above all else.

By 2030, temperature and evaporation will increase and rainfall will decrease across Australia (median projected changes from 1990 to 2030)*



* Based on mid-range global emissions scenarios.

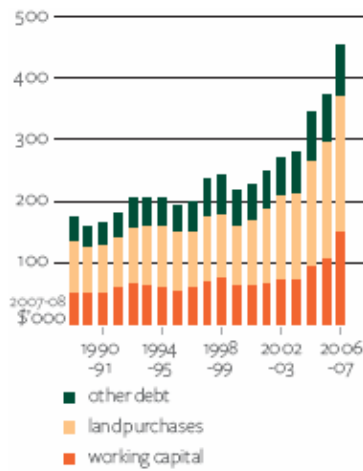
Source: CSIRO and BOM 2008, *An assessment of the impact of climate change on the nature and frequency of exceptional climatic events*.

As the Garnaut Climate Change Review and other recent research makes clear, Australia is expected to be one of (if not the) most adversely affected developed countries on earth, in terms of both environmental change and economic impact.

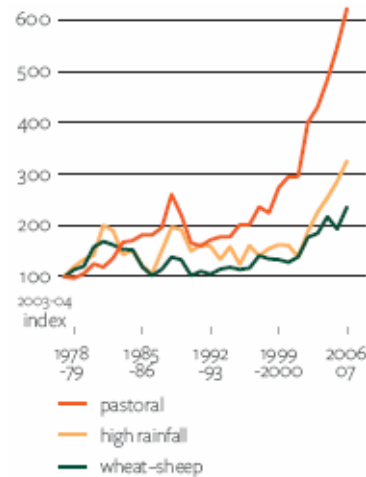
Based on CSIRO and BOM (2007) projections of a rise in temperature of 1° by 2030 and 0.8° to 2.8° by 2050 and assuming no mitigating factors, ABARE estimates agricultural production would drop from what it otherwise would have been, due to greater frequency of extreme weather events (floods, storms and droughts), more pests and diseases, as well as the higher temperatures and lower rainfall themselves. An offsetting positive impact on agriculture from 'carbon fertilisation' is possible, but is likely to be of limited effect in Australia due to the hotter, drier climate. ABARE modelling suggests that given CSIRO and BOM's expected climate changes, and assuming no other mitigating factors, Australian wheat production would drop by 9.2% by 2030, beef by 9.6%, sheepmeat by 8.5%, dairy by 9.5% and sugar by 10%. Agricultural exports would decline by a similar amount and annual GDP would be 2.8% lower. The actual scenario however, is likely to be better than this due to mitigating factors such as the Emissions Trading Scheme (due to start in 2010), agriculture water infrastructure upgrades and Australian agribusinesses' proven ability to adapt.

Australian agriculture debt and investment

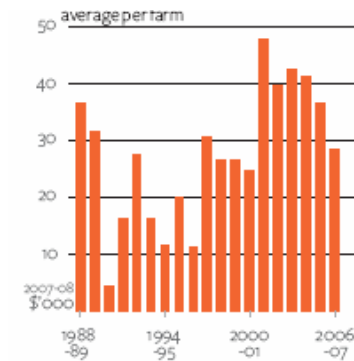
Total Australian broadacre farm debt has increased...



... but so have broadacre farm land prices ...



... and capital investment by broadacre & dairy farms.



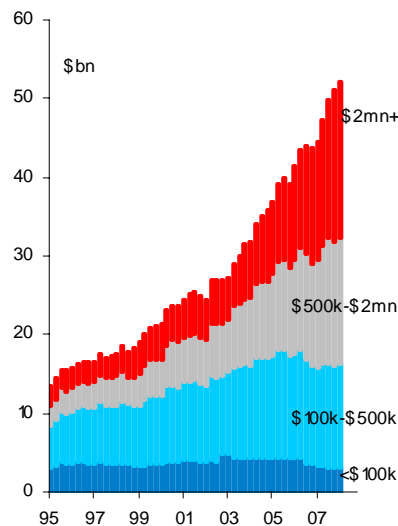
Source: ABARE, *Australian farm survey results, 2007-08*.

As is the case for the Australian economy as a whole, agricultural debt has been increasing, but so too have land values. As noted above, average farm equity has remained at around 85%. And even in the drought of 2006-07, 85% of all broadacre and dairy farms kept farm equity at 70% or more, the highest proportion of farms in 30 years. Of the 15% with low farm equity (under 70% equity in ABARE's survey), around a third — 5% of all broadacre and dairy farms — also had negative cash flows in 2006-07. This small group of farms will be vulnerable to rising credit costs and/or reduced credit availability going forward.

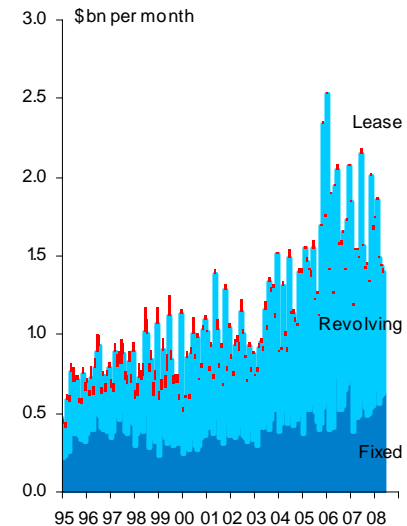
Reflecting rising property values and growing average landholdings as farms merge and consolidate, growth in total bank lending in 2007-08 is mainly in the larger loan sizes of \$500k-\$2mn and \$2mn plus. Data on new commercial financing to agribusinesses indicate fixed rather than revolving or lease finance is still much preferred. The ABARE annual farm survey indicates that land purchase remains the main reason for increasing farm business debt, followed by working capital and other finance needs, although debt financing for working capital did increase during the drought in 2007 and into the recovery phase.

Australian bank lending to agriculture businesses

Total bank lending to agriculture



New commercial lending to agriculture



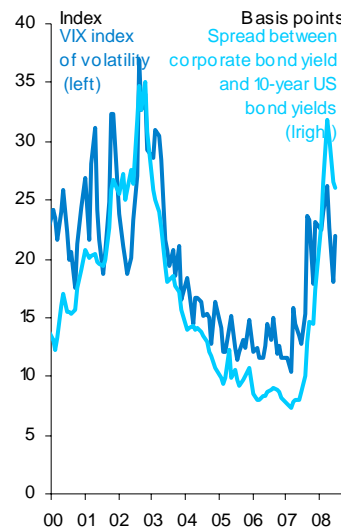
Source: ABS and RBA.

In global financial markets, commodities shot back into the favourites list in mid-2007 and have been rising ever since. The still-unfolding US sub-prime mortgages story has rocked the US property and financial markets and has rippled through credit and equity markets globally. Since mid-2007, \$381bn in losses have already been declared by major banks, with up to \$600bn expected in total. Market volatility and the cost of credit have increased world-wide as a result, and investors' appetite for risk has decreased in response.

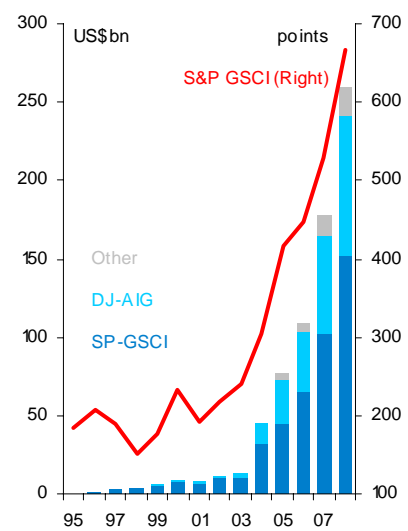
In all this turmoil, investors have sought out refuges of security, stability and healthy returns, including the world of commodities. On several index measures (including the Dow Jones AIG index of 19 commodities and the Goldman Sachs Commodity Index of 24 commodities), international investment in commodity funds and companies has increased exponentially through 2007 and 2008 to date. Investment in the first quarter of 2008 alone reached over US\$250bn, well over the (record) total for all of 2007. Most of this investment attention is currently focussed on hard commodities, which took an estimated 70% of investment dollars in this area in 2007. Investment in agricultural commodities is increasing also, as rural commodity prices have tracked the hard commodities upwards, albeit with a lag and without the same frenzied intensity. If 2007 was the year of the hard commodity for investors, then 2008 could well turn out to be the year of the soft commodities.

Global market volatility has built up again since 2007, encouraging more investors to look again at commodities (70% hard, 30% soft)

Market volatility indexes



Commodity investment indexes



Source: Datastream

New Zealand's agriculture sector is going through a structural shift, with less sheep and beef and more dairy production

New Zealand agricultural outlook

There is no doubt the New Zealand economy is slowing significantly. The impact of fixed debt held by households, the squeeze on business profits, the spillover into labour markets and the major structural change taking place in agriculture — from beef and sheep to more profitable dairy production — is taking its toll.

Lamb and milk products are New Zealand's key agricultural exports, with beef, fruit, wine, venison and other products making up the balance. New Zealand agriculture has a solid reputation for quality, innovation and unique products. It is generally holding up better than the wider economy through the current downturn. There is however, a wide dichotomy in profitability between various sectors of New Zealand's agriculture and horticulture, with returns to dairy producers strongly outperforming meat production. The outlook for dairy is positive too, with favourable prices expected for milk, butter, cheese and other fresh dairy product exports until at least 2009. In response, farm land use change from sheep and beef to dairy production shows no signs of slowing.

This is providing good opportunities for new entrants into dairy production and processing, but leaving meat producers and processors with some big issues to deal with. Farmers remaining in sheep and beef are starting to make radical changes to their livestock policies in an effort to improve short-term profitability. In the longer term however, their outlook remains positive, with steady increases in global demand for red meat (see below) and limited competition.

Farming land with an existing dairy or viticulture base continues to increase strongly in value. The value of other classes of farmland has stalled. Willingness to increase debt for land purchases is low, given the current economic climate.

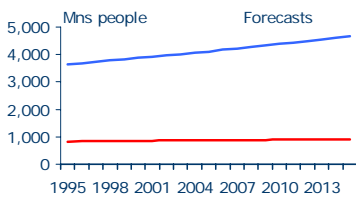
Prices for prime dairy and viticulture land are increasing strongly. Prices for other agricultural land has stalled.

New Zealand agriculture price forecasts

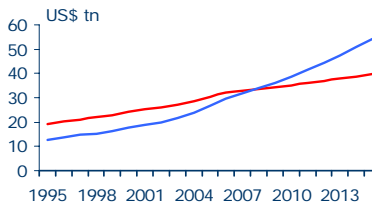
	2007	2008e	2009f
Average dairy co-op payout, \$/kg ms (YE July)	4.49	7.60	7.00
Lamb, NZ\$/hd	56	57	70
Mutton, NZ\$/hd	38	34	38
Apples, NZ\$/tce FA	20	19	22

Source: ANZ National Bank Limited.

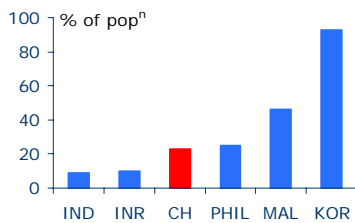
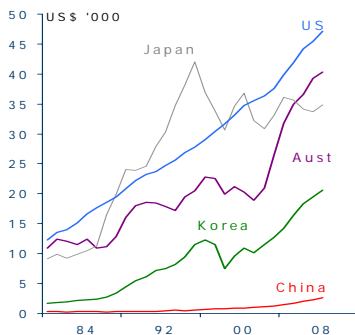
Developing countries dominate population growth..



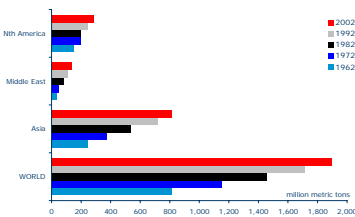
... and economic growth.



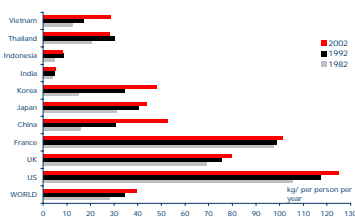
As Asian incomes and middle classes grow...



... so does grain consumption



... and red meat consumption.



Sources: OECD, Earthtrend, Datastream, IMF.

Global demand outlook

Australasian agriculture typically exports around two-thirds of total production (in a normal-to-good year), so global demand trends are central to its story. Our agricultural produce is used for food, feedstock, fibres and more recently, fuel. The economic drivers for these various categories are similar and are based mainly on population, income and consumption trends (which in turn, are driven by other macroeconomic factors such as economic growth and trade).

On all of these measures — population, income, consumption, economy and trade — global growth is currently dominated by developing countries and especially by Asia. China is widely tipped to overtake the US as the world's largest economy by 2017 and India will retain 3rd position, by sheer economic size. At the same time, China and India's incomes per capita and urban middle classes are also growing, as are those of other countries in the region.

For food and diet, rising incomes and urban populations mean more meat and more processed foods, both of which drive up demand for grains (for direct food and for feedstock) and for livestock. Asia's share of global grain consumption has grown from 30% in 1962 to 42% by 2002, and is projected to grow further. Red meat consumption has grown even more dramatically: from just 4.4kg per capita in 1962 to 52.4kg in 2002 in China, from 3.2kg to 48kg in Korea and from 11kg to 28.6kg per capita in Vietnam. Despite elevated feedstock costs, the OECD-FAO expects world beef, sheep, poultry and pork production to continue to grow, to meet this huge appetite for meat, with prices to stay buoyant as well. This trend augurs well for long-term demand for Australasia's beef and sheepmeat sectors, as well as coarse grains produced for feedstock purposes.

Global demand for grains, oilseeds and sugar is also being affected by the newly booming market for biofuels, generously supported by quotas and subsidies in the US, EU and other countries. Indeed, prices for virtually anything that can be made into a fuel have skyrocketed in recent months, as petroleum prices soar and governments increase their support for biofuel production. Lately, the environmental value and social costs of biofuels have been questioned by the UN and other agencies, concerned at the effect biofuels are having on food markets. Dairy products on the other hand, are still consumed mainly in the mature markets of the US and EU. Significantly for New Zealand dairy producers, EU milk import quotas will increase annually until they are abolished in 2015.

Selected agricultural commodities, world prices and production forecasts

World prices	2007-08e	2010-11	2013-14	2017-18f
Wheat US\$/t	318.6	225.9	231.2	230.6
Coarse grains US\$/t	181.3	189.0	173.0	164.6
Rice US\$/t	361.0	330.7	340.3	334.5
Sugar, raw US\$/t	229.3	257.6	298.0	301.7
Beef & veal US\$/100kg	327.1	325.4	317.1	328.7
Sheepmeat NZ\$/100kg	318.8	365.8	392.4	435.6
Skim milk powder US\$/100kg	431.6	314.4	304.7	304.6
World production	2008e	2011f	2014f	2017f
Wheat Mt	602.4	647.5	667.6	689.4
Coarse grains Mt	1,059.1	1,113.3	1,157.4	1,216.7
Rice kt	659,170	653,735	671,823	689,356
Sugar raw kt	166,039	170,405	177,039	189,044
Beef & veal kt	68,107	72,060	75,546	79,475
Sheepmeat	13,824	14,582	15,334	16,106
Skim milk powder kt	3,362	3,491	3,677	3,833

Source: OECD-FAO 2008, Agricultural Outlook 2008-17

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