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# Primary Industry Management

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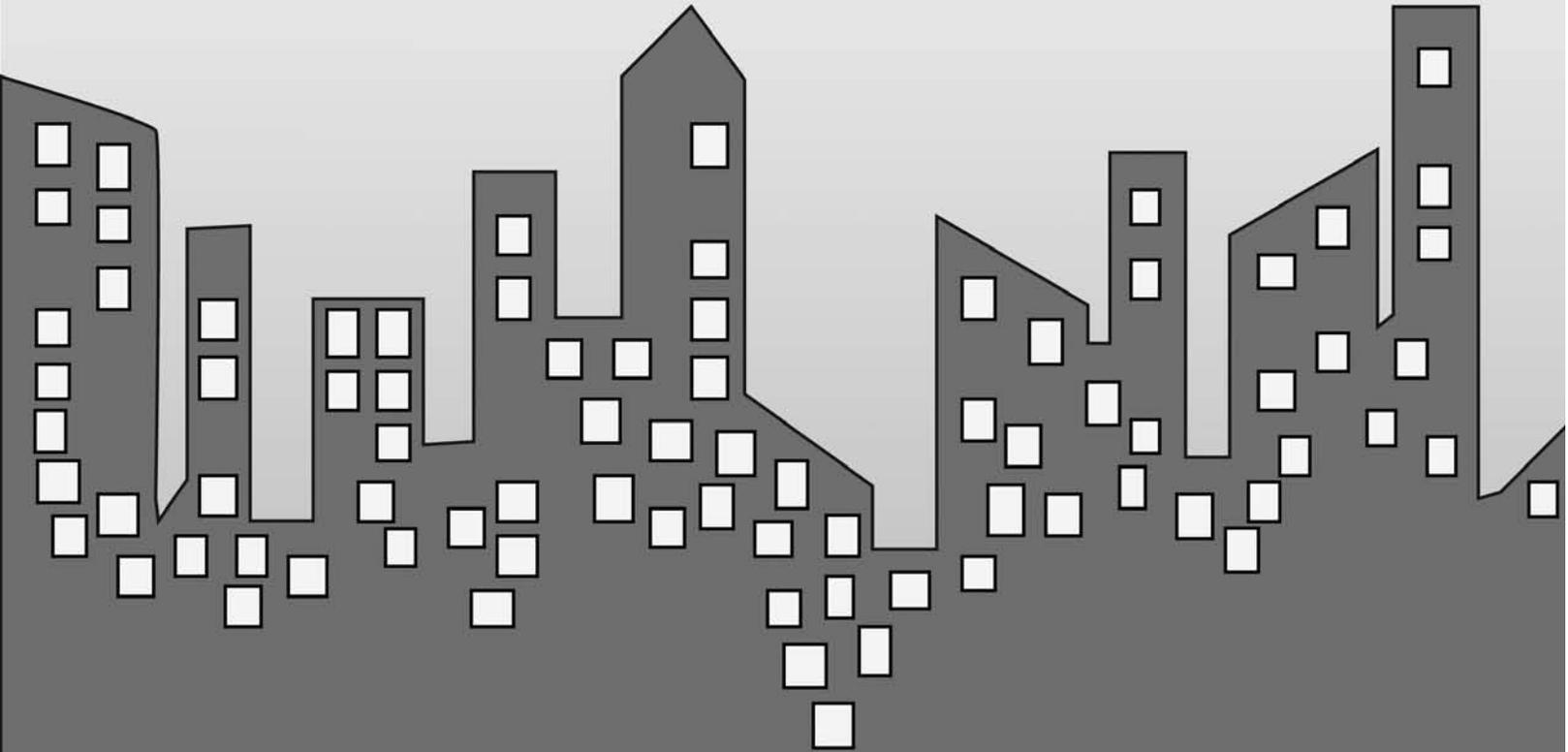


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### Julian Bateson

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# Keeping your eye on the ball

Risks, problems and challenges for primary industry are always going to be facing anyone who dips a metaphorical toe in the soil. Dairy farmers, for example, will always have concerns about Tb and how well it is controlled, with the nightmare of foot and mouth disease always a distant worrying threat.

Foresters can lie awake at night worrying that perhaps a foreign insect, not yet discovered, has arrived from overseas and is already chomping through radiata pine somewhere. With around 95 per cent of plantation trees in New Zealand being just one species, the wood industry is very vulnerable to such a problem.

The kiwifruit industry was worried that the Queensland fruit fly could be introduced in fruit imported from Australia, and quite rightly. When there was the suggestion that stone fruit could be allowed in from apparently uninfected areas of Australia, the kiwifruit industry lobbied hard for the summerfruit industry to say no to imports. They were aware that their own industry could be devastated if this fly ended up in New Zealand.

However, while worrying about this biosecurity problem and numerous others, Psa-V managed to sneak in and take hold. The latest figures suggest a cost to the industry of perhaps \$400 million over the next five years and double this in the long term. So perhaps it could well cost \$1 billion in total.

We now hear that the government is to streamline border security even further by profiling passengers and then not subjecting them to checks. This may help a few people walk more rapidly through customs. It will not make the country any safer, quite the reverse.

We saw what happened when monitoring of beehives was relaxed in the 1990s. In what seemed no time the varroa mite was here. The mite was so well established when discovered that the fight was over before it began, and will cost the country billions of dollars over the years. As this journal goes to the printer we have not heard that any more fruit flies have been discovered, so perhaps the one male caught was the only survivor.

Reducing biosecurity at our borders, whether it is a shortage of dog handlers at Wellington airport or streamlining

of passengers, is not a good option. The risks are too high and the consequences too severe. The article in this issue of *Primary Industry Management* on biosecurity, written by the Ministry for Primary Industries, outlines the fine balance of allowing people and goods to travel with minimal disruption. It is not a confidence builder.

Another apparent risk is the sale, or not, of New Zealand land to overseas companies. Two articles in this issue of *Primary Industry Management* look at the fallout of the Crafar farm fiasco. There is no question that the New Zealand owner of the farms was not good enough to run them properly, otherwise the company would not have gone so badly bankrupt. Overseas owners are unlikely to do worse. But should the land be sold to someone who may never set foot on our shores? This debate will not subside for some time.

Another debate unlikely to subside is how well the Christchurch rebuild will be managed and how it will affect the rest of New Zealand. There is discussion about how much wood should be used in the rebuild. Wood is an excellent construction material and we have plenty of mature trees ready to supply the industry who are ready to use the latest technology with laminated and cross laminated beams. Wood is also carbon neutral, unlike steel and concrete.

If wood is used for virtually all the construction it will still only consume a small percentage of the available New Zealand plantation production. Articles in this issue of *Primary Industry Management* look at wood processing in the Bay of Plenty and the opportunities for using wood in biopolymers and bioplastics. There is going to be a significant increase in available mature timber over the next 10 years, so any research which improves the marketing opportunities is welcome.

However, as the early part of this editorial notes, it would only take one introduced pest to seriously damage or destroy all the radiata pine we have. We must keep the pressure on the government to ensure that biosecurity is given the highest priority all the time. The country depends heavily on its primary industry and we need to know that the best protection which we can afford is being used to prevent unwanted pests entering the country.

Owen Cooney

## Governance – a model for dairy farming

*Change is an integral part of doing business anywhere in the world today. Few sectors in this country have accepted change in such a relatively short period of time as the dairy industry. Twenty years ago the stereotypical dairy farmer was one family, one farm, one son, one herd and so on. However, the dairying landscape has now undergone considerable change. The key to this massive change has been the willingness of farmers to adopt a more sophisticated approach to running their operations and the adoption of the corporate business model.*

Because many dairy farms have become such large enterprises, farm owners have had to delegate more of the day-to-day operations on the farm to management teams and focus on strategic matters required to run large businesses. Therefore the corporate model has been adopted widely and is being used with various levels of sophistication.

Over the last 10 years the industry has rewarded risk-takers. Now we are seeing unprecedented amounts of volatility in the industry as it deals with such things as high debt-to-equity ratios, interest rate management, resource consents, an exchange rate that can change dramatically overnight and an uncertain global economy. In addition to these external factors, the pressure for generational change is becoming more significant as the age profile of farmers increases.

### What is governance?

In the future, success for dairy businesses will depend on good management and good governance. The low-hanging fruit has been picked. So what exactly is governance? Governance is a term so frequently bandied around these days that the eyes of many farmers glaze over at the mention of it. A popular definition is – the means in which the leading authority, often a board of directors, guides and monitors the values and goals of its organisation through policy and procedures.

But governance is more than that. Leaders cannot guide and monitor a successful business without a thorough knowledge of the whole range of disciplines and a clear understanding of the aspirations and values of the owners. Good governance is an area where farm businesses have the potential to unlock real value if owners are prepared to take a hard look at the way they operate. It is a rare individual who will have accumulated all the skills, experience and knowledge necessary to run a successful modern dairy business.

However, by formalising regular reviews in association with people who are skilled in particular segments of the business, owners can lift the performance of their operation to new levels. Good governance will also provide a means by which generational and succession problems can be solved.

Farm owners should not feel threatened by the introduction of good governance structures. In almost all other sectors of economic activity, businesses



of the size of a modern dairy operation have such structures. These are seen to provide significant value to owners by making available easy access to additional expertise and the benefit of independent thought and analysis. No business these days can afford to be an island. A modern business moves at such a pace, and is so interactive with such a wide range of disciplines, that failure to be involved across a wide range of activities increases risk and is likely to place it on a path of decline and failure.

## Elements of good governance

What are the critical elements of good governance? In some instances where the business is of sufficient size this may be achieved by the appointment of a corporate style board of directors, but that is not going to suit many farm operations. The use of the word board uses a formality which may sound excessive for most dairy owners. However, it is hard to find another word which covers the conscious deferment by owners of their decision-making process to an independent entity which will enable the benefits of such processes to be achieved.

So for the want of a better word I will use the word board to include a governance structure which may be far less imposing than that of a corporate board of directors. The appointment of a board is one element of a good governance regime. It will not in itself lift business performance – Enron had a board of directors and look at the mess it got itself into.

### The three elements

Three other elements are fundamental to the establishment of a good governance regime. First, there must be a commitment by owners to accept the disciplines of looking for decisions relating to the business through a collaborative process. This process will typically involve regular and formal meetings with agendas dealing with decisions critical to its operation. It does not mean that the owner must cede control. However, unless an owner is prepared to listen and evaluate the advice of others, no amount of restructuring will unlock the benefits available from a good governance regime.

A second element is the careful appointment of people with requisite skills to add value to the business. Such people must have empathy with the ideals and values of the owners, so their selection must be careful and considered. Appointees must bring an independence of thought, but they must also be able to work as a team. A champion team will lead a team of champions.

The third critical element is the establishment of a well-drawn up governance charter which clearly sets out the roles and processes of the governance board. This charter will be similar to a job description for the board and will cover the relationships between the board and management and the board and the owner. Dairy owners should not be frightened by terminology. Experienced advisors will guide you to an appropriate governance structure. The benefits are real for those who are prepared to take the steps.

## Advisory boards

It is probably fair to say that there is still some skepticism by many farm owners as to the merits of a board structure. However, we find that the use of an advisory group finds favour with existing farm owners. As they are less formal, and do not have decision-making capacity, this helps with acceptance from some.

An advisory board is an advisory team consisting of usually two or more groups which have appropriate skills. This team is formed with the objectives of helping the business achieve growth, strategic goals, and for it to form a strong management team, identifying and managing risk, and maintaining alignment with the business plan. It is not a board of directors and does not aim to play any role in management. The advisory board members are not expected to act as having governance responsibility so do not have the same risk or liability as directors, or to have technical expertise in the on-farm operations.

People are vital to most businesses and the more livestock involved, the more the focus of the owner needs to be on the people involved, especially the performance, their skills, core competencies and training. This is where good governance is invaluable because good businesses generally have good governance questioning and reviewing good management.

The attraction of an advisory board is that there is no real set of rules in establishing one. It is really up to the farm owners and any advisors they wish to involve to determine the shape and look of the board – you can make your own rules. However, it will be important to agree and document the procedures that the board will adopt.

Our experience is that an advisory group should convene quarterly, six-monthly or even annually. It is important that an agenda be developed and agreed to so that the group meetings are not simply a talkfest with no sense of direction. While you can make your own rules, it is important nevertheless to have rules and then to abide by them.

## Conclusion

Whether a formal governance structure is implemented or an informal one, as the enterprise becomes bigger and more complicated there is benefit in separating either wholly or partly the roles of leader and manager. Experience from North America and Australia shows that family operations which take the time to develop a family business charter enjoy greater success in achieving the objectives of the business plan and the succession plan. Because they have an agreed set of rules and protocols, the inter-relationship between the business and the family promotes an efficient, effective and successful enterprise.

*Owen Cooney is a Partner with Cooney Lees Morgan, Tauranga. Cooney Lees Morgan is the winner of the Best Mid-Sized Firm in the NZ Law Awards for 2010 and 2011. Areas of specialty include work with corporations, small to medium enterprises, rural businesses, individuals and families. A shorter version of this article was first published in the Rural News.*

# Foreign ownership of rural land

*Concerns about the foreign ownership of rural land in New Zealand have been around for a long time and seem likely to continue into the future. The first British settlers brought with them a concept of freehold land ownership which was completely alien to Maori who believed land was not something that could be bought and sold. Inevitably disputes between the two cultures arose and 170 years later many of these are still being resolved under the Treaty of Waitangi settlement process.*

Early on in European settlement, large tracts of grazing land mainly in the South Island were acquired by wealthy investors on a speculative basis. At the same time, pressure began to build on the government to provide more small farms for recently arrived settlers. The introduction of a graduated land tax, based on unimproved value, was aimed at the owners of large grazing blocks. This was one of the mechanisms used by the government to expedite the subdivision of this land. In addition the land tax had a 50 per cent loading for absentee foreign owners.

Foreign ownership of rural land came into prominence again in the 1950s when enterprising real estate agents began to market a number of northern coastal properties and islands to overseas buyers, particularly to the United States. When the public realised some islands in the Bay of Islands were being acquired by foreign interests there was pressure on the government to stop further sales.

Changes to make it more difficult for foreign owners to acquire sensitive coastal properties were introduced with amendments to the Land Settlement Promotion and Land Acquisition Act 1952. This Act was repealed in 1995 and controls governing overseas investment in land were brought under the Overseas Investment Act 1973. This legislation has been reviewed and replaced by the Overseas Investment Act 2005.

### Overseas Investment Act 2005

The purpose of this legislation is 'to acknowledge that it is a privilege for overseas persons to own or control sensitive New Zealand assets'. Authors Heatley and Howell note that the main focus for assessment of an application to purchase land under the Overseas Investment Act are the land area and characteristics. They summarised sensitive land as a freehold estate or any other interest for a term of three years or more in any –

- Foreshore, seabed, lake bed, regional park, land reserve, land held for conservation purposes or subject to a heritage

order

- Non-urban land in excess of five hectares
- Land in excess of 0.2 hectares adjoining the foreshore
- Land in excess of 0.4 hectares that adjoins a lake, reserve, heritage or conservation land or includes an historic place, area or wahi tapu
- Land on specific islands.

An additional rule, introduced in 2011, directs the Overseas Investment Office to consider a wider range of issues when assessing foreign investment in areas of farmland more than 10 times the average size of any given type of farm.

### Public access rights

Public access to lakes, rivers, beaches, islands and the remote high country has always been of particular concern to New Zealanders. In a number of cases the only practical access to fishing, hunting and tramping resources is through privately-owned farmland. In most cases, farmers have been willing to give access provided it does not interfere with farming operations such as lambing. However, in some cases where farms were owned by overseas interests, public access became blocked.

In one case in the North Island, boundary riders carrying guns warned off hunters and fishers who historically had access through the station. In another situation in the South Island, former Prime Minister Helen Clark and her party were allegedly denied access through a high country station and had to resort to hiring a helicopter to reach their destination. In both these cases it appears there were cultural differences between the overseas owners who strictly enforced the 'right to exclude' part of their property rights and the more relaxed attitude of most New Zealand farmers. The latter typically see themselves as stewards of the land and as such are willing to go along with historical public access arrangements.

However, probably the most protracted argument about access, lasting 10 years, occurred on Waiheke Island when a

New Zealand 'rich lister' blocked a paper road over his farm leading to the Stony Batter site. The Auckland City Council ultimately won the case at the Privy Council and public access was restored.

### Right to roam

Of course the demographic dominance and political power of the mainly urban-based population means that New Zealand is likely to move towards the British 'right to roam' model with designated walkways. An example of a farmer with the public interest at heart was the late John Aspinall of Mt Aspiring Station and his work with the New Zealand Walkways Commission.

Applications by foreign interests to invest in New Zealand rural land are considered by the Overseas Investment Commission, which operates under the Overseas Investment Act and the amendments. Criteria and factors listed under sections 16 and 17 of the Act include requirements that –

- Farmland is offered on the open market to local purchasers
- Foreign investors in New Zealand farmland must be of good character
- The investment has to show economic benefits to New Zealand
- Mechanisms must be in place to protect or enhance the resource.

### Good examples

Under this legislation there have been some good examples of situations for the absentee overseas owner and the New Zealand public where both are winners. One such example is the high country stations near Wanaka acquired in 2005 by Canadian singer Shania Twain and her then husband Matt Lang. Apparently, the initial reluctance by the Overseas Investment Commission to agree to this sale was overcome when the applicants agreed to provide public access under the walking access factor as set out in the legislation. The 27 kilometres of walking track provide access to over 13,000 hectares of conservation land and a hut paid for by the Langs.

Another example situation has been provided by American Julian Robertson, developer of the Cape Kidnappers and Kauri Cliffs resorts and golf courses, on what was formerly average coastal sheep and beef farms. The intensive trapping operation and 10.5 kilometre predator-proof fence on Cape Kidnappers is reported to have been funded mainly by Mr Robertson.

Naturally not everyone sees these acquisitions as a benefit for the New Zealand public. There is a worry that wealthy foreigners drive up the price of rural land beyond the reach of what New Zealanders can economically pay for land on a productive basis. To some extent, existing farmers have a conflict when advancing this argument because they are usually happy to sell to the highest bidder, whoever that might be.

The argument against foreign buyers has more substance from the perspective of the financial burden placed on young farmers hoping to acquire their first farm. This may carry some weight if the trend of an increasing

percentage of farmland sales to foreign ownership escalates. However, in recent years, the percentage of total farmland sold to foreigners on an annual basis has been very small at around 0.1 per cent to 0.3 per cent each year.

### Looking at the statistics

The table below summarises the Overseas Investment Office approvals for purchase of freehold or other interests in New Zealand land along with the total freehold farmland sales recorded by Quotable Value. Farmland sales do not include forestry land. Quotable Value statistics for 2011 are not yet available, but the trend of a higher percentage of farmland sales to foreign ownership is most probable, given the increased land area approved by the Overseas Investment Commission.

#### Total land area approved for sale to foreigners and freehold farmland sales

Year	Freehold approved OIC hectares	Freehold farmland approved OIC approximate hectares	Other interests approved OIC hectares	Freehold farmland land sales hectares	Freehold approved OIC of total farmland sales
2011	68,054	28,477	23,627	-----	-----
2010	17,040	17,040	14,789	122,218	13.9%
2009	22,345	10,261	9,897	109,886	15.5%
2008	13,842	12,754	24,854	347,760	3.0%
2007	15,826	7,122	754	316,680	4.0%
2006	198,574	21,672	71,934	251,940	2.8%

Foreign transactions in 2011 were dominated by about 40,000 hectares of forestry land purchased by mixed international interests including Swiss, American and Australian. A United Kingdom company, Soho Property Ltd, purchased 22,211 hectares of Crown Pastoral lease to add to the 8,579 hectares bought in 2009. Significant dairy land, mostly in Southland, was purchased by the German companies Aquila AgrarInvest and DAH Beteiligungs GmbH during 2010 and 2011.

Before 2010, sheep and beef and forestry sales dominated purchases by offshore investors from a range of countries including the United States, Switzerland, Australia and the United Kingdom. The 2006 figures include the sale of the 176,900 hectares of the Carter Holt Harvey Forest Estate. The most recent agricultural census in 2007 records 14.7 million hectares of farmland in New Zealand, and the combined freehold and leasehold sales to foreign interests since 2006 equates to less than three per cent of this farmed area. Quotable Value statistics show that between 2006 and 2010 the annual turnover of rural farmland sold was between one and three per cent each year.

### Crafar farm case

Before farmland can be acquired by overseas buyers it must first be offered to New Zealand interests. In the case of the Crafar farms, selling has turned out to be a complex process.

The farms were offered for sale by international tender, with prospective purchasers given the opportunity to buy a single property, a combination of properties or the entire portfolio of 16 farms. While details are unknown it appears that the receivers had a preference to sell the entire portfolio. In this case the first potential Chinese buyer was turned down, but was reported to be offering a higher price than various New Zealand interests.

A second Chinese buyer, Milk New Zealand Holdings, a subsidiary of Shangai Pengxin Group, gained initial approval from the Overseas Investment Commission. This decision was successfully appealed in the High Court by a group of New Zealanders led by Sir Michael Fay and iwi interests. The Court's decision appears to raise the threshold test for foreign applicants with respect to adding value to the transaction in a way New Zealand buyers could not.

The Crafar farms are a dairy farming operation and do not have the same sort of recreational values associated with them as do coastal properties and high country stations. They do, however, illustrate the increasing importance to foreign buyers from food importing countries of acquiring land for food security purposes.

### **Land grabs**

Competition around the world for the control of good productive land is increasing due to rising population pressures and the competition between competing land uses including food production, bio-fuels, forestry, urbanisation and conservation. In addition, climate change and land degradation in some economies are limiting the food-producing potential of some of the food-importing nations.

The extent of land grabs over the last decade is hard to define but has been estimated at around 80 million hectares, with more than 50 per cent in Africa. New Zealand has not featured in the land grab as land in this country is relatively expensive and a long way from major markets.

Foreign buyers from the Middle East, China and South Korea have tended to concentrate on what they describe as resource seeking – land and water – rather than market seeking acquisitions. An example of resource seeking might be the production of basic grains and animal feeds offshore. In the case of milk production this means controlling the supply chain from the production of grain overseas and its distribution to the milking platform in the home country, where it would be easier to monitor and control food standards.

### **Fonterra threat**

One of the dangers to New Zealand of allowing overseas buyers to acquire large-scale dairy farms is the potential threat to the Fonterra co-operative ownership model. The overseas marketing power of Fonterra is potentially weakened by having reduced products and influence on the world trading market. New Zealand Milk Holdings, the prospective purchaser of the Crafar farms, noted an intention to establish a joint venture with New Zealand partners to develop, process and export dairy products to China. To protect New

Zealand interests, the Overseas Investment Office listed consent conditions requiring at least half ownership or a control interest in milk processing facilities in New Zealand must be held by non-overseas persons.

Realistically, it seems unlikely New Zealand will shut the door on overseas investment in farmland anytime soon. As a nation we continue to be a net importer of capital and our free trade arrangements with various countries are likely to exclude moving much beyond the present Overseas Investment Commission regulations and the recent High Court decision.

From a theoretical standpoint there is an argument for having a capital gains tax on farmland capturing the speculative activity involved in by overseas and local buyers of farmland. With prices at around 40 times earnings since 1990, New Zealand farms are very highly priced compared to a range of 15 to 26 multiplier earnings for Australia, Canada and the United States. Such high price earnings ratios in New Zealand only make sense in a regime free of capital gains tax. The current political reality is that capital gains tax seems unlikely to be implemented under the present government.

### **Crown forestry model for land ownership**

While it is true that foreign owners cannot take the land with them, and eventually some of the land gets resold back to local owners, concerns about foreign ownership remain. It may be possible to achieve a beneficial situation by separating the business of farming from the business of owning land. Land ownership has been retained by the indigenous inhabitants in some of our Pacific neighbours such as Fiji and the Cook Islands and further away land ownership is retained by the government in China.

Could the Crown forestry model for land ownership be applied to foreign buyers of farmland? Readers will recall that when the government-owned forests were sold off to international buyers in the 1980s, the Crown retained the land and sold the cutting rights to the trees.

Rentals for this forestry land are based on a percentage of the value of the land exclusive of trees, and a large percentage of the land is now under the control of local iwi as a result of Treaty settlements. A new farmland model could provide for the land exclusive of improvements to be sold to New Zealand-only investors such as the Cullen Fund, with a long-term lease of the improvements to overseas investors with a commitment to the business of farming.

Public opinion polls around the 2011 election campaign in New Zealand clearly showed there is a strong public preference to retain, and not partially privatise, the state-owned energy companies. Retaining this country's farmland under local ownership has historically also been an issue most New Zealanders support. The current rules around overseas investments appear to be adequate provided they are enforced and the process is transparent. What does appear to be sometimes lacking is follow-up and monitoring when a foreign buyer does not abide by the original conditions of sale.

**Daniel Kalderimis**

## Foreign direct investment in New Zealand farmland – some further reflections



*The Crafar farms saga has become a litmus test for how New Zealand's attachment to rural land intersects with its increasing participation in a global economy. At the time of writing, it is not clear the end has yet been reached. Still, as the dust on recent developments clears, this article offers a few thoughts for the future.*

### **A recap of the Crafar farms saga**

The CraFarm Group was, until it went into receivership in 2009, the biggest private family dairying business in New Zealand, comprising 7,892 hectares over 16 North Island farms. Following the receivership, the application by Hong Kong's Natural Dairy consortium to purchase several of the Crafar farms became mired in controversy. In December 2010, Natural Dairy's applications were rejected on the basis that the government was not satisfied that all of the individuals with control of that company were of good character.

At the end of January 2011, it was announced that the Chinese Shanghai Pengxin Group had made an offer to buy the farms for \$200 million. That bid was accepted by the receivers, and was subject only to Shanghai Pengxin's Overseas Investment Act 2005 application being granted.

On 19 January 2012, the Overseas Investment Office (OIO) recommended that the government approve the application, and on 26 January 2012 the Land Information Minister and Associate Minister did so.

On 15 February 2012, the High Court set aside that decision on the basis that the Ministers had incorrectly applied the national benefit test under the Overseas Investment Act by using the wrong 'counterfactual' to assess that benefit. According to Miller J, the benefits asserted by a foreign investor in sensitive land should be compared not against the state of affairs before the overseas investment, but against the likely state of affairs if the investment does not proceed. In simple terms, a 'before/after' comparison was directed to be recast as a 'with/without' comparison. On 20 April 2012, the Ministers accepted a second OIO recommendation that the Shanghai Pengxin application passed the clarified national benefit test, and again granted approval.

### **What has New Zealand learned?**

As my previous article argued, the rationale for being opposed to foreign investment in New Zealand farmland – but in favour of Crafar or Fay ownership – is not immediately obvious. The argument about profits going offshore overlooks that the purchase price for the farm ought to equate to the net present value of those expected future profits. Limiting the market for farm buyers may not be in the real interests of New Zealand farmers.

Moreover, turning our back on foreigners runs directly counter to New Zealand's true economic imperatives. This country's future lies in stronger penetration of major overseas markets. We will not get there by ploughing our own

furrow, but by partnering with foreign capital, knowledge and distribution networks. One example of this is Fonterra's strategic joint venture relationship with Nestlé in order to penetrate Latin American markets. In short, the price of enhancing global penetration is doing deals.

That is not to say that all deals with foreign investors are good deals. But they are certainly not all bad – even in the agricultural sector. Lincoln University's Keith Woodford gave the example of Synlait earlier this month, which he described to Radio New Zealand as an example of how Asian investment could be a very good arrangement.

When asked about the downside of profits going offshore, he replied that New Zealand agribusiness need to think in terms of partnerships. Foreigners will not invest in this country unless there is a return. New Zealanders will not make deals unless there is a benefit. Bright Dairy has since provided both capital and a supply chain into the Chinese market.

## What was opposition about?

To my mind, the underlying concerns held by farmers about foreign ownership tend to relate to three issues – undue land aggregation, risks of vertical-integration and increasing farm corporatisation. These issues are, however, generally owner-neutral.

Undue land aggregation could be addressed by general rules limiting ownership of a single individual or entity, rather than specific rules restricting foreign investment. This might be worth considering. Vertical integration can occur regardless of the nationality of the landowner and New Zealand already has several locally-owned independent processors. Synlait, which was vertically integrated before Bright Dairy's investment, is one example.

Irrespective of foreign investment, the days of family-owned dairy farms financed by large mortgages are giving way to corporate structures with investor equity participation. The numbers involved show why.

## Large and diversified

When Fonterra was formed in 2001, New Zealand had around 14,000 farms. It now has around 10,000. Farms are growing larger and ownership is becoming diversified. In many cases there is still a family controlling and operating the farm, but increasingly a corporate structure and business disciplines are being used. Often more than one farm is being operated in a single corporate structure. Outside investors are coming in via investment schemes and syndicates. Foreign companies buying farms are only part of the story.

Although most New Zealand farms are still in family ownership, this may not be the case in 10 years. In Australia, the average age of farmers is 56, and it is increasing at 1.2 years each year. A similar trend is likely to be evident in New Zealand. Therefore, the sector is about to undergo a major structural change. Many younger people are not interested in owning, and cannot afford to own, a farm. At the same time, many older farmers will need to work out how to exit investment and plan succession.

## Not family farms

Farm price increases have been driven by local factors, including increased farming intensity, rather than foreign acquisition. The days of 200 cow family farms are numbered. The main factors causing intensity increases are economies of scale, increased technological efficiencies and new funding models permitting increased investment.

In three to four years' time, the average dairy farm will have 500 cows. That is going to worth around \$7 million to \$8 million. This is not a family farm anymore nor is it affordable by a young farmer without additional funding.

A recent example of increased corporatisation is the effort in March by Pastoral Dairy Investments to raise \$75 million to buy up to eight farms in the South Island. The business model anticipates that farming operations will be outsourced to MyFarm, which already owns 47 properties and runs over 30,000 cows.

## Useful test

The solutions to land aggregation, vertical integration and corporatisation are complex and evolving. There is no real evidence, however, that intensive screening as set out in the Overseas Investment Act national benefit test is necessary or sufficient.

This does not mean, however, that the national benefit test should be abolished. The test is a useful mechanism for formally extracting what economists call spillover benefits from foreign investment in farmland. In many cases, this substantial benefit is likely to result, as it did in Shanghai Pengxin's bid, in international advantages and connections.

However, to be effective the test needs to be applied fairly. Our screening rules become devalued if they are seen as political levers to exclude unpopular foreign investment. This has been a regular habit. Currently it is the turn of the Labour Opposition to fan the flames. We need to ask whether New Zealand is locked in this political cycle, or whether there is a way out.

## Should we further tighten our rules?

New Zealand already concentrates the focus of its foreign investment screening regime on agricultural but not the mineral resources. By contrast, this country generally permits most other investments, even in strategic sectors such as utilities, media and banking, subject to a good character test for large foreign business investments.

Nonetheless, in the wake of the Crafar saga, some commentators have suggested further restricting access to New Zealand farmland. One popular option would be to change the rules so that foreigners cannot own sensitive land, but can merely lease it. This would not exempt transactions from the Overseas Investment Act national benefit test, because the test applies to long-term lease as well as sale transactions.

A different mechanism would be to borrow from the Forestry Rights Registration Act 1983, which provides that

forestry rights agreements create a form of property right which is registrable under New Zealand's land transfer system. This would allow New Zealand farmers to sell the right to economic rents from their land in a way which would bind subsequent purchasers, but without selling or even leasing the land itself. The property right created is already expressly exempt from the Overseas Investment Act national benefit test.

### **Attitude change needed**

Both mechanisms would likely take the heat out of political opposition to foreign ownership – but at the price of introducing a discriminatory regime against foreigners, and risking retaliation under New Zealand's existing and future free trade agreements. From an economic perspective, such legislative changes would achieve very little.

From a political perspective, the answer may be different. The issue of land ownership has strong historical and cultural associations for both Maori and non-Maori – therefore the resonance of the slogan that New Zealanders do not want to be tenants in our own land. These two associations were in play, although diametrically opposed, in the bitter political battle over the foreshore and seabed legislation. The Marine and Coastal Area (Takutai Moana) Act 2011, with its notion of public domain ownership, was a symbolic solution to a political problem. In the Crafar farms debate, the two associations are more closely aligned against a perceived common enemy.

Feeling under siege is not constructive. It is in New Zealand's wider interests not to spend the next decade locked in a destructive political conflict which involves taking pot shots at foreign investors. Shanghai Pengxin's spokesperson was 'stunned by the amount of apparent anti-Chinese feeling' its bid had generated. Jim Sutton, Chairman of Landcorp, recently stated: '[we] risk pointlessly chilling the most important economic relationship we have'. To the contrary, it is important that New Zealand sends signals that it understands the benefits of Asian foreign capital, and is open to ways to partner with foreign businesses to develop offshore products and presence.

All of this requires a change in attitude from hostile to welcoming, from besieged by outsiders to seeing new opportunities. It basically involves moving from a lose/lose to a win/win mentality.

The question is how we get there. In particular, can New Zealand make this attitude shift naturally or is some form of regulatory change a necessary catalyst? As to the answer, it seems appropriate to consider Chairman Mao's famous 1950s quotation about the lessons of the French Revolution – it is far too early to tell.

*Daniel Kalderimis is a partner at Chapman Tripp. The opinions expressed in this article are those of the author, and should not be attributed to Chapman Tripp as a whole. Chapman Tripp has acted for Shanghai's Pengxin's subsidiary, Milk New Zealand Holdings Limited*



**Jan Wright**

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## Water quality – the importance of understanding the science



*When Parliament appointed me to the position of Environment Commissioner five years ago, I came into the job knowing a great deal about some environmental matters and relatively little about others. Water quality was one area in which I had to work rapidly to come up to speed. I clearly recall an evening with Professor David Hamilton from Waikato University when he patiently did his best to give me a rapid grounding in the basic science.*

In 2010, I had the rewarding experience of speaking about water quality science to Members of Parliament. A request from several MPs for more, led to developing greater expertise within my office on water quality and eventually to my recent report on water quality.

The aim of my report on this area released in March 2012 *Water Quality in New Zealand: Understanding the Science* is to provide a guide to water quality science. It covers those aspects which are most useful for the many New Zealanders who are involved in, and concerned about, various aspects of this high profile environmental issue. Water quality science is complicated, much is unknown, and the devil often is in the detail.

### **Fresh water and pollutants**

There is effectively no limit to the different aspects of water quality which could be covered, so the report is not intended as a complete reference on the subject.



Its scope is confined to fresh water – in rivers and streams, lakes, wetlands, estuaries, and aquifers – and to the three main water pollutants of greatest concern in New Zealand. These three are pathogens, sediment and nutrients.

Pathogens are invisible microbes that cause disease and deserve being labelled pollutants, but sediment and nutrients are only water pollutants by virtue of being in the wrong place. They belong on the land, not in water. Too much soil and rock washed off land become destructive sediment in water. Nutrients, specifically phosphorus and nitrogen, should also stay on the land helping plants grow there rather than in water. We want fertile land, not fertile water.

### Cause and effect

In a 2011 interview, the incoming President of Federated Farmers, Bruce Wills, was described as keen to have a frank science-based discussion with the nation about dairy pollution. ‘If we have a dirty river let’s understand why it’s dirty and what science can tell us about fixing it ...’ . I strongly agree with Mr Wills. He has put his finger squarely on the value that science can provide – understanding cause-effect relationships. Because water quality is an issue of such widespread public concern, this understanding must also be widespread.

In my report I sought to go beyond providing lists of sources of water pollutants and their damaging effects. The aim was more ambitious – to explain as simply as possible why a particular pollutant causes certain effects and therefore provide a basis for how well a particular intervention might improve or protect water quality.

I was interested to learn, for example, about an important difference between nitrate and phosphate – the main forms in which the nutrients nitrogen and phosphorus occur as water pollutants. Nitrate is very soluble in water, but phosphate generally is not. One intervention aimed at preventing nutrients from moving off land into water is a riparian strip, a fenced margin along banks covered with plants that will take up nitrogen and phosphorus as they grow. In general, riparian strips are much better at reducing phosphate than nitrate because nitrate can elude the roots of the plants and travel through groundwater directly into the waterway.

### Past and present

Concerns over the effects of nutrients on water quality have grown over recent years, but we should not delude ourselves that all has been well in the past. Decades of burning of forested hills to create pasture for sheep farming is largely responsible for the widespread erosion which continues to carry sediment into our rivers and lakes.

In addition, while dairy cows are the greatest source of nitrate in many of our catchments, sediment from erosion is the greatest source of phosphate. While on the subject of phosphate, city dwellers concerned about water quality should be aware they can do their bit by switching to phosphate-free detergents and laundry powder.

### Using the science

To be effective, water quality policy and action must be based on science. I think this means the following –

- Measuring the different parameters of water quality
- Understanding the causes of change in those parameters
- Designing interventions which are likely to be effective
- Measuring the effectiveness of those interventions.

In 1911, there was an outbreak of typhoid among workers in flax mills in the Manawatu. The cause was deemed to be the rancid water coming out of the mills, but it was actually the sewage from the town of Feilding. While this mistake is not one we would make today, we are still capable of wrongly linking cause and effect. Once that is done, we cannot design interventions that will be effective.

We need to know when more science is not needed. A call for more science to be done can sometimes be a way of delaying difficult decisions. There is, for example, no need for more scientific data or modelling to establish the link between the land use change that has taken place in the Waituna catchment in Southland and the dire state of the Waituna Lagoon. There simply is no other explanation.



Scientists themselves are not always the best people to advise when more science is required – their basic motivation, quite rightly, is to continue to explore and gather new data. While science is necessary for policy, it is not sufficient. Science does not tell us how to make trade-offs, and these will almost certainly be needed. It is very unlikely that we can have our cake and eat it. Even if technical fixes were to become available for dealing with all our water quality problems, they would still cost a great deal of money.

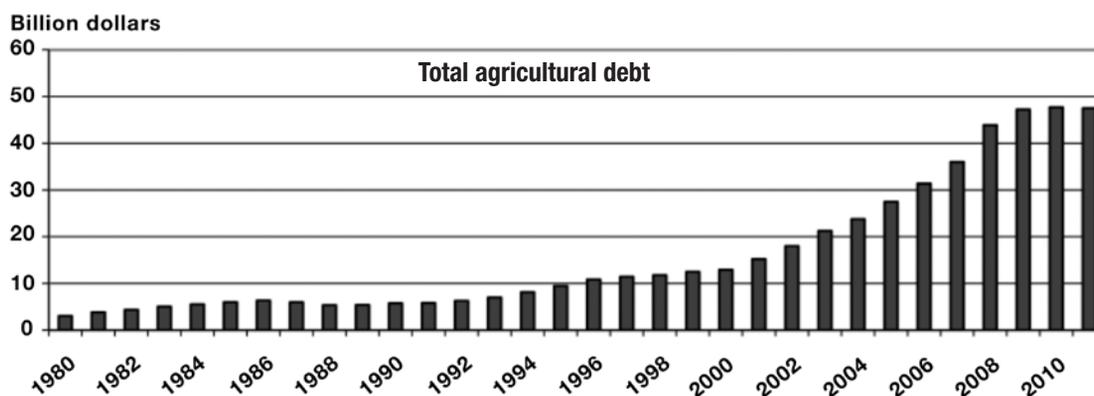
I am aware that my own knowledge of the science of water quality has increased significantly since my presentation to MPs in 2010. There is no end to the complexity, but the state of our rivers, lakes, wetlands, estuaries, and aquifers is of great importance to this small country of ours. Increasing our understanding is a worthwhile investment and will pay dividends for our children and grandchildren.

*Jan Wright is the Parliamentary Commissioner for the Environment.*

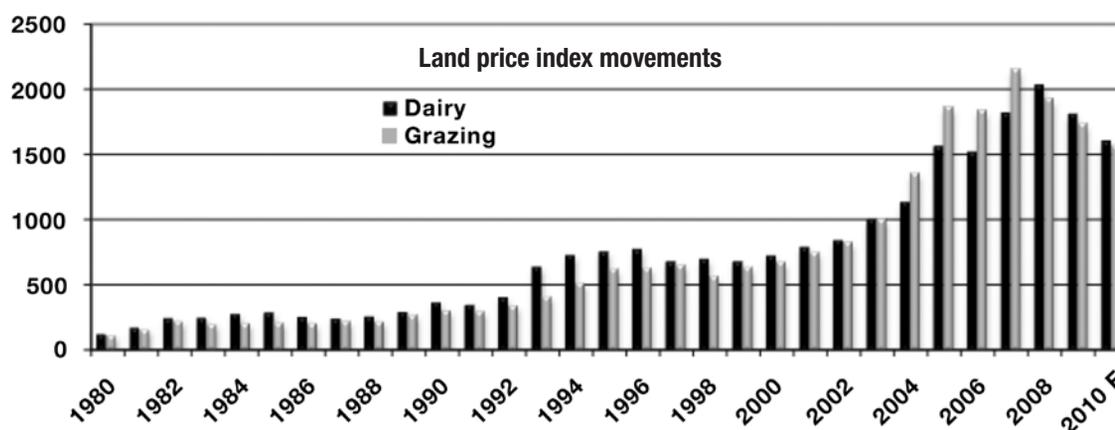
# Farm debt – the elephant is still in the room

Much was made of the farm debt situation in 2008 and 2009, following the global economic meltdown. It was compounded by the effects of various adverse climatic events such as drought which affected farm costs and production. This concern has been more muted over the last two years, not that the aggregate debt situation has improved markedly, but mainly due to improved farm incomes.

However, while individual debt problems may have improved, the New Zealand agricultural sector still faces a significant debt burden, particularly the dairy sector. As can be seen in the graph below, aggregate agricultural debt trebled from around \$3 billion in 1980 to \$12.9 billion in 2000. It then almost quadrupled through the 2000s, fuelled by easy access to credit, to reach \$47.7 billion by December 2010 – a 15.5 per cent rate of growth each year.



This shows a reasonably close correlation with land prices, at least through to 2008. It leads you to suspect that easy credit was the major push behind land prices – much more so than farm profitability.



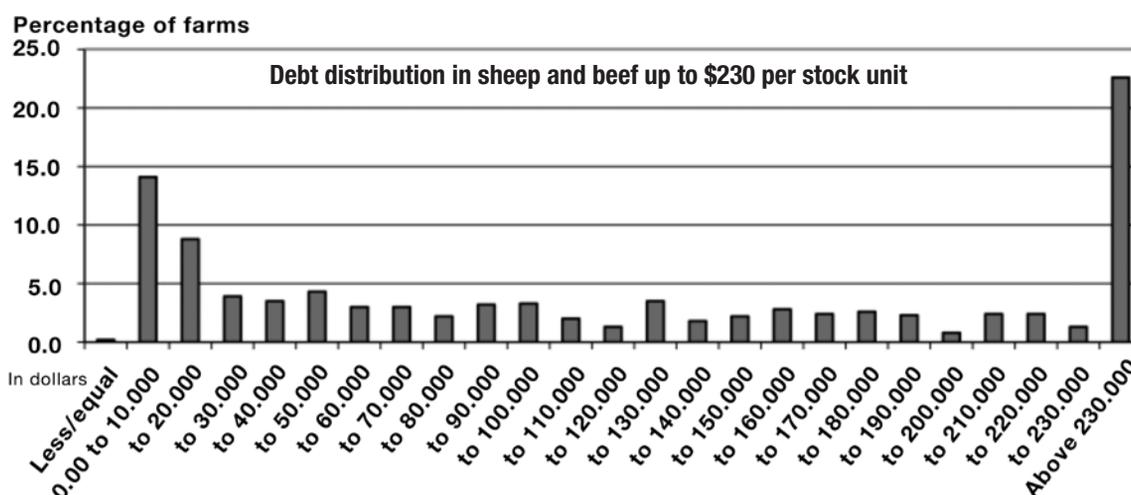
Aggregate debt reached a peak of just over \$48 billion in September 2010. It then declined by \$700 million through to December 2011 as farmers took advantage of improved income, and following calls from the trading banks to reduce debt. In the first two months of 2012, however, aggregate debt has increased by around \$200 million based on the latest available Reserve Bank figures.

Within agriculture, debt accumulation varied significantly between the different sectors, as shown in the table. This directly indicates the significant proportion of debt being carried by dairy farming – almost two-thirds of the total.

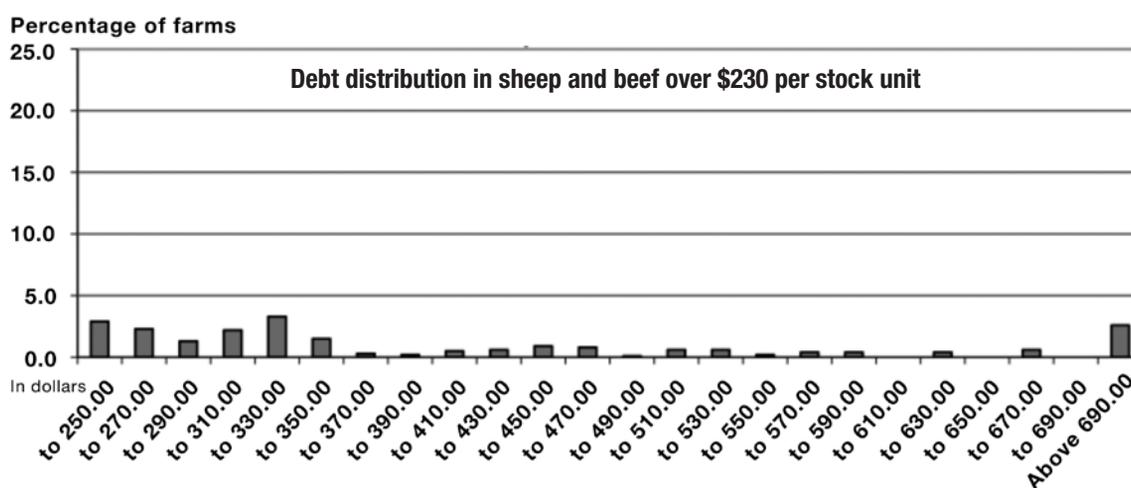
### Sector debt

Industry	Debt in 2004 billion dollars	Debt in 2011 billion dollars	Percent of total debt in 2011
Horticulture	1.62	3.38	7.3
Arable	0.68	1.5	3.3
Sheep and beef	5.4	9.53	20.6
Dairy	12.3	29.72	64.3
All other farming	0.65	1.13	2.4
Servicing Industry	0.53	0.975	2.1

At the farm level, there also tends to be a skewed distribution of debt, with a minority of farmers carrying most of the debt. This is the old 80/20 rule, where 20 per cent of farmers are carrying around 80 per cent of the debt. It is illustrated by data from Beef + Lamb NZ and DairyNZ, as shown below.

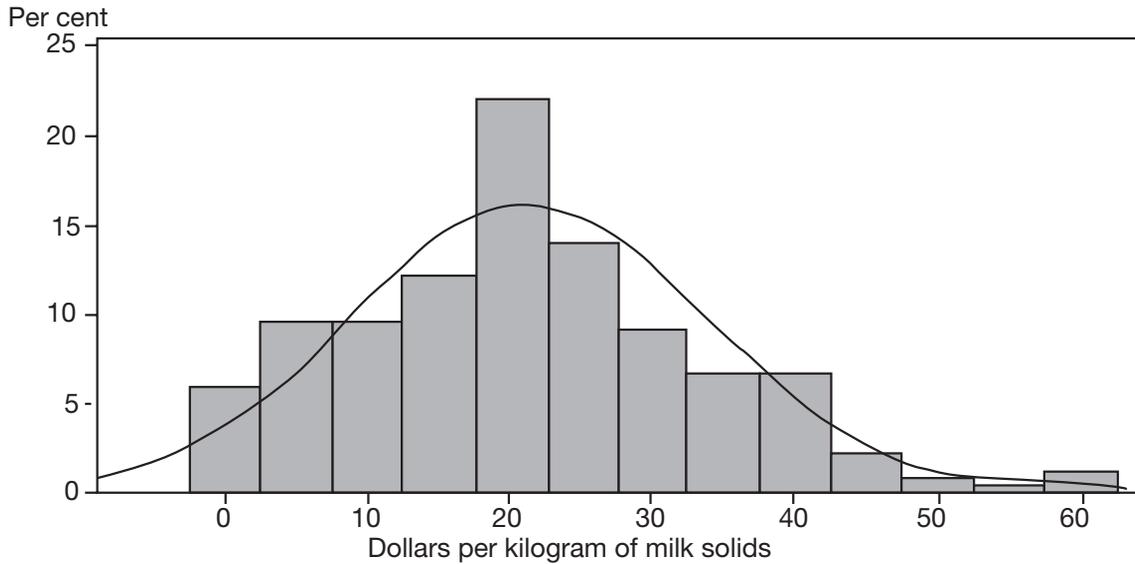


Average debt in 2009/10 was \$159.49 per stock unit. For those more heavily indebted farms, the distribution of debt is outlined in the next graph. This shows that around 2.5 per cent of sheep and beef farms are carrying a debt of greater than \$690 per stock unit.



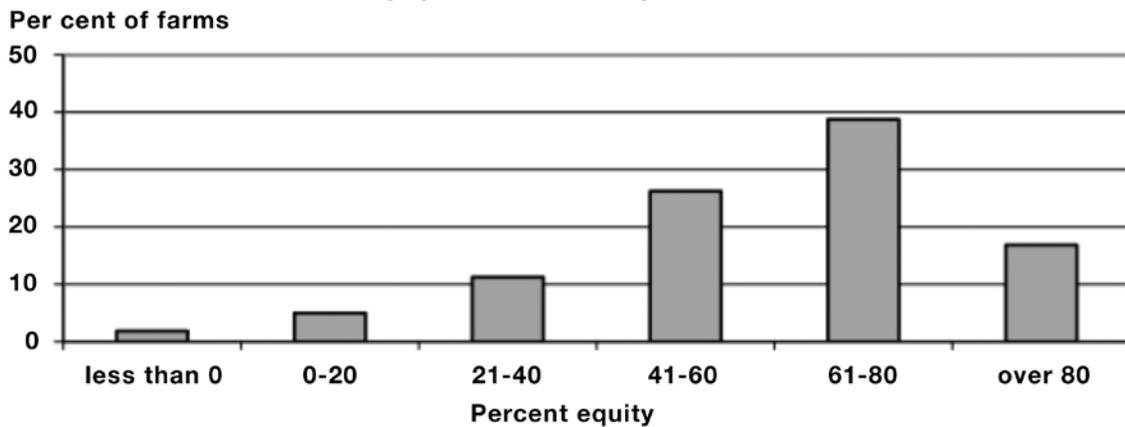
For the dairy industry, debt distribution follows a more normal distribution curve, albeit with a significant tail as 18 per cent of farmers have a debt greater than \$35 per kilogram of milksolids. The average debt for the 2009/10 year was \$21.65 per kilogram of milk solids.

### Owner operator closing term liabilities

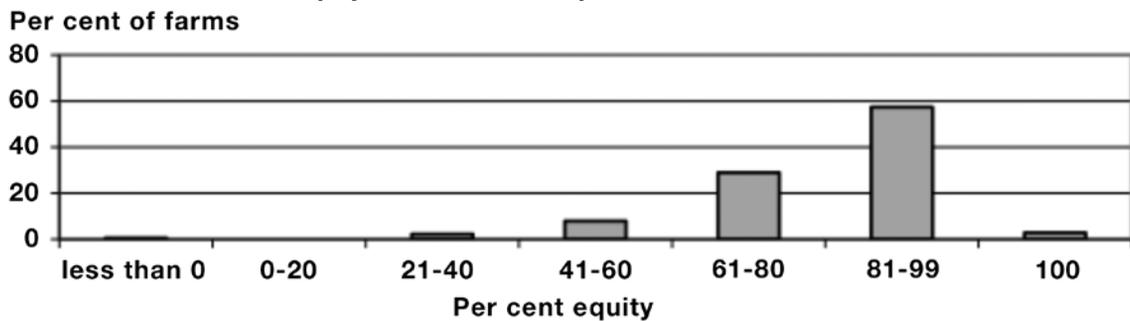


Over the last 14 years from 1995 through to 2009, average equity levels have remained relatively stable, although at different levels for each sector. The Beef + LambNZ economic survey shows sheep and beef equity levels sitting around the 80 per cent mark over this period, dropping back to 77 per cent in 2009/10. DairyNZ figures show dairy farm equity levels sitting around the 60 to 65 per cent level over this period, dropping back to 58 per cent in 2009/10.

### Equity distribution on dairy farms 2010/11



### Equity distribution on sheep and beef farms 2010/11



The drop in equity in recent years is mostly related to the reduction in land values rather than increased debt. The distribution of equity within each farming sector also shows a different pattern. This again highlights the generally higher equity position for the sheep and beef industry, or transversely,

continued on page 17>>

# Gypsy Day from a law firm perspective

*Thoughts of gypsies conjure up images of caravans, flowing clothes, sandals and horses. Gypsy Day in Southland ticks some of those boxes – swap the caravans for stock trucks, the long flowing clothes and sandals for swandri's and gumboots, the horses for cows, and you are almost there.*

## 1 June settlements

1 June each year is the start of the new milking season for dairy farmers and is the day the vast majority of dairy farms change ownership. On that day, or the closest working day to it, our law firm deals with the legal work associated with these transactions. The day itself sees the culmination of months of preparation of hundreds of different legal documents, meetings with sometimes very anxious and busy farmers, negotiations with banks, meetings with accountants and the changing of hands of millions of dollars.

Agreements for sale and purchase with the 1 June settlements hit our desks from July every year and continue arriving right up until May. When a contract is received our involvement is in dealing with the contractual terms. This is often and preferably in conjunction with the real estate agent. Dairy farm transactions involve many complicated special conditions that the standard house transaction does not.

## Common contract matters

Each farm sale and purchase contract contains its own unique conditions and circumstances. However in general there are a number of matters to be addressed at the contract formation and approval stage that are common to most dairy farm contracts. These common matters include –

- Obtaining land information memorandum documents from local authorities
- Finance conditions.
- Purchasing entity decisions and tax consideration
- Checking easements
- Ensuring water supply and irrigation schemes are in place
- Applications by the farmers for milk supply contracts
- Arranging for adequate grass cover and feed to be available on settlement
- Building and plant valuations
- Ensuring DDT levels are acceptable to the milk company
- A meeting of minds by the vendor and purchaser as to possible early access by the purchasers if development work is required
- Purchase of dairy company shares

**Land Information Memorandum (LIM)** The LIM documents are issued by the local authority and provide zoning information for the property and list any resource consents issued for it and neighbouring properties. We mainly use them to check that all the relevant building consents have been issued for the buildings on the farm.

It is very often the case that there are sheds which have not received their final code compliance certificates. Arrangements are made for them to be signed-off by settlement or funds retained until that has happened. The LIM also reveals special features of the land including areas prone to erosion, slippage or flooding.

**Finance conditions** Most farm contracts contain a clause making them subject to the purchaser obtaining sufficient finance. This is often reliant on the sale of an existing farm property, often a separate condition in itself. With millions of dollars involved it is vital that all aspects of the funding are in place before confirming any finance condition. Special consideration needs to be given to any guarantee requirement a bank might have, and these often see directors of a farming company personally guaranteeing lending.

**Purchasing entity and tax** A lot of time is spent discussing the best entity to own a farm, whether it is a closely-held family company, a large equity partnership involving a company structure, a limited partnership, a family trust or a partnership. Accountants are an important part of these discussions and taxation and risk considerations are vital. A new purchasing entity needs to be registered for GST once formed.

**Easements** Rights of way and water easements are common on farm properties. Everyone needs to be aware of their obligations in relation to the maintenance and upkeep of these, and to also ensure they have access to the areas they need. Where water easements are involved we need to make sure there are correct easements in place for the pipes to run to the right areas.

**Milk supply contracts** Normally the ability to obtain a supply contract is not a big drama, but is often a condition in an agreement.

**Grass cover and feed requirements** Ensuring that adequate grass cover and feed is available on settlement is

imperative to a farm's ability to start their milking season properly. Often poor weather conditions mean there is inadequate cover and supplements. In the past this has led to a number of settlement day disputes and last minute negotiations as to an appropriate level of compensation for such shortfalls. Today most well-drafted contracts anticipate the potential issue and provide remedies, as well as providing for a farm consultant to be available to assess cover immediately prior to settlement.

**DDT** Dairy companies have maximum standards for DDT in order for a farm to be able to supply milk to them. A purchaser needs to ensure there are no hot spots on a farm which might affect the ability to supply. Often historical DDT tests are used.

**Early access** Especially where a conversion is taking place, and often where development work is being undertaken, a purchaser wants early access so the work can be completed over the winter period before the start of milking. Normally this can be negotiated at the contract formation stage. It is agreed to, provided deposits have been paid and all conditions in the contract are confirmed and it is unconditional. You need to be careful to ensure adequate insurance cover is in place during any early access period.

**Dairy company shares** If a farm is to be a shared supplier it is important that sufficient shares are purchased from the vendor to allow the farm to supply the milk. The

number of shares held must equate to the level of milk solids supplied. Consideration also needs to be made to deferred milk payments and who is to receive those, as well as to any later imposed requirements for increasing or decreasing shareholding, depending on the final season milk supply figures.

## Caution is required

All the above points form part of a solicitor's consideration when reviewing or drafting a farm contract with a 1 June settlement date. There are of course other matters to be addressed as well. A well-considered legal contract will often include five to six pages of conditions, all requiring careful analysis.

Other potential problems include trees on a farm, specialist subdivision clauses, plant and chattel valuations, resource management warranties, de-stocking requirements, tax consideration and any lease issues. There are also likely to be consideration in relation to the emissions trading scheme. Erring on the side of caution and having legal involvement from the negotiation stage is recommended in order to ensure Gypsy Day itself can be all about moving the stock and settling into new farms rather than dealing with legal issues.

*Toni Green is with AWS Legal in Invercargill*

## >> Farm debt – the elephant is still in the room continued from page 15

the greater risk in the dairy industry.

There is nothing inherently wrong in using debt – leveraging is a time honoured way of increasing returns on funds and in creating wealth. The trick of course is to ensure that the debt can be serviced, and as long as this can be achieved, there is no problem. But therein lies the problem with the current situation. Farm incomes have been good over the last two years, and coupled with a drop in interest rates, this has meant that the debt servicing load has been reduced absolutely and proportionally.

But even at a good income level, there are farmers who are struggling to break even. This may well be as a result of being in early development or low production, and in many of these situations the farm is probably being subsidised by other income.

### Break even dairy pay-out required in 2010/11

Break even analysis dollars per kilogram of milk solids				
	Mean	Median	Bottom 10%	Top 10%
FWE	3.87	3.78	4.63	3.17
Debt servicing	1.32	1.23	2.59	0.75
Depreciation	0.37	0.31	0.59	0.24
Drawings	0.60	0.52	0.67	0.39
Total	6.15	5.84	8.48	4.56

### Still some risks

What all this means is that there is still a risk to a significant minority of pastoral farms within New Zealand to reductions in pay-out or schedules and increases in interest rates. While interest rates seem relatively calm at the moment, it is difficult to say how long this may continue. With the western world clawing its way back from the economic crisis, the scarcity of money and higher capital adequacy ratios for banks may well push interest rates up higher sooner than monetary authorities may wish. Within New Zealand, rural lending also now has a greater risk weighting.

Similarly, as every farmer knows, market returns fluctuate. The average dairy farmer now needs a pay-out above six dollars a kilogram of milksolids to break even.

Coupled with all this is the issue around increasing farm costs. The primary producers index, the measure of on-farm cost inflation, for livestock farms has increased by 28 per cent from 2000 to 2010, whereas the dairy primary producers index has increased by 70 per cent. The only answer to such relentless cost increases, outside of greater market returns, is an equally relentless improvement in productivity. But that is another article.

*Phil Journeaux is a consultant with AgFirst based in Hamilton, recently arrived from his position in MAF. He specialises in economic analysis, tech transfer, policy development and farm management.*

**David Turner**

# The wood processing industry in the Bay of Plenty

## Challenges and opportunities



*When Sir Bob Owens moved to Tauranga in the early 1950s it was the potential in the wood processing industry that first caught his attention about the Bay of Plenty. After an initial investment in sawmilling he soon moved into stevedoring, logistics and log export. Sixty years on and things have changed very little.*

The Port of Tauranga thrives, the stevedoring and logistics companies are growing into world class operations and forest management companies recently reported excellent returns for their owners. However, the wood processing industry continues to struggle. It seems with rhythmical consistency that now we observe another voice asking – Can we do something better with all those logs we are exporting as raw material?

As an investor, this was a question I answered with the establishment of Sequal Lumber in 2008. Despite significant amount of evidence to the contrary, a few mates with backgrounds in farming, horticulture and banking decided it was time to do something better with all those logs we are exporting.

We could not have chosen a worst time to start processing our first orders in August 2008, and it would be untrue to say that we have found it easy since then. However, we continue to believe that the answer to the question above remains yes, but probably for different reasons than when we first began.

### **Fundamentals of wood processing**

A comprehensive assessment of the fundamentals for wood processing in the Bay of Plenty was commissioned by the Bay of Plenty Regional Council as part of their 'Bay of connections growth strategy'. This has progressed to the recent release of a comprehensive publication which includes a detailed action plan for the growth of the wood products industry in the area.

This publication, called *Are We Ready? World Class Forestry and Wood Processing*,



was written by consultant John Galbraith with support from various industry and government specialists. It does a good job of outlining the natural benefits the Bay of Plenty has to offer to support the growth of the wood processing industry.

Most of these are well trodden, so I will simply reference what I perceive to be the main benefits.

**Log supply** The central North Island region currently harvest more than 40 per cent of the national forestry harvest. Over the next decade log harvest volumes have the potential to increase by over two million cubic metres a year, the result of substantial planting that took place in the region in the early 1990s.

**Logistics** The Bay of Plenty boasts the most efficient port in New Zealand, and proximity to the Port of Tauranga represents a significant benefit for wood processors. The port brings with it the auxiliary infrastructure required to build a successful export business – rail, trucking, stevedoring and trade documentation.

**Energy** The combination of renewable energy and low-cost electricity represents a competitive advantage for New Zealand wood processing. A renewable resource, processed with the help of renewable electricity and dried with renewable energy, is exactly what the world demands. Kawerau in the eastern Bay of Plenty is the best place in the world to bring this advantage to industry.

**Broken ground** While the wood processing industry is not thriving in New Zealand it has broken ground, particularly in the Bay of Plenty. There are a number of successful operations that exist, or have existed. This has created a cluster of knowledge and personnel available to draw from in forest management, engineering, mill

management or research and development. The presence of existing demand for residue consumption also adds viability to any start-up operation.

Against that rather idyllic backdrop, why is the wood processing industry not thriving in the Bay of Plenty? My experience so far in the industry highlights some cyclical factors, but I also believe there remain some structural impediments to growth which need addressing.

## Cyclical factors

The two most pertinent cyclical factors affecting the wood processing industry are a depressed housing market and the dollar exchange rate. Housing starts in New Zealand are currently around 12,000 against a long-term average of 20,000 homes a year. Housing starts in the United States are currently around 600,000 versus a long-term average of around one million. In the peak of the housing market in the United States, housing starts were around two million homes a year. This substantial decline and elongated depression in demand has resulted in significant over-capacity in the timber framing industry.

The high dollar has also affected New Zealand sawmill competitiveness offshore. This is compounded by the level of currency manipulation which has occurred in Asia, the region which has provided the engine of global growth since 2008.

## The currency effect

One look at the foreign currency reserve creation from Asian central banks over the last five years and it is clear the extent of this headwind. Whereas in other industries in New



Zealand and Australia this currency effect has been offset or at least cushioned by commodity price appreciation, the over-capacity in the wood processing industry globally has meant our industry has not been given this reprieve.

Our view is that these two headwinds are beginning to abate. While we anticipate a continued period of below average housing starts in the United States given existing inventory levels, we expect to see a 20 to 30 per cent improvement over the next couple of years. This would result in housing starts below the long-term average, but still a significant improvement from current levels. We also see housing demand in New Zealand improving significantly in the next couple of years as Auckland moves back to trend and the Christchurch rebuild gets under way in earnest.

With respect to the currency we expect decreasing demand for raw materials in Asia over the near term to soften commodity prices and the currency with it. However the reality, I believe, is that with every major central bank in the world printing their currency, the dollar will sit in a higher band than we have previously observed. As an organisation, Sequal Lumber has had to learn to manage this risk better. This means understanding the correlation between foreign exchange and timber prices, between foreign exchange and log prices, and the hedging necessary given log price-fixing arrangements and timber sales receipts.

### Structural factors

There are also various structural factors which have impeded the growth of the wood products industry, and it is these which present a greater threat to its growth. The most often cited are lack of scale and high labour unit costs relative to a

developing country, where they purchase a New Zealand log and process it with cheap labour. I see both of these factors as irrelevant in the long term.

Scale is achieved by investment, investment requires capital, and capital is attracted to an industry which offers a return. With respect to relative labour unit costs, technology is a great leveller. In areas of the wood processing industry we can produce at a lower labour unit cost per cubic metre than a developing country if we invest in the right technology.

The greater structural impediments to the success of the wood processing industry are government intervention, the need for whole log solutions, lack of in-country sales and our inability to turn proximity to resource into an advantage.

### Government intervention

The wood processing industry outside New Zealand has high levels of interference by governments. This manifests itself in different ways, in different countries, to the disadvantage of New Zealand industry. The most obvious is a tariff on New Zealand wood which is common throughout Asia. In Korea for example, New Zealand wood attracts a tariff, whereas Chile, our major competitor there, enjoys no tariff at all.

In India there is a tariff differential between New Zealand log and timber imports. This benefits the New Zealand log trade at the expense of this country's wood processors. Sometimes a tariff takes on a more subtle form. For example, in China with whom we have a free trade agreement, in some jurisdictions municipal safety regulation requires extra wood required in a building if using pine versus North American fir. This creates an inherent disadvantage to New Zealand processors.



## **Subsidies and currency manipulation**

Significant subsidies for producers are also evident in the Americas. In Canada there is low cost stumpage, almost no-cost stumpage, for wood processors, and again in Chile the government offers low-cost logs to the wood processing industry.

Add currency manipulation by Asian central banks into this mix and the overall effect of government interference creates significant price and supply distortions. This inhibits the growth of the New Zealand-based wood processing industry. To its credit the government, led by the Hon Tim Groser, is advancing bilateral trade negotiations which I am sure will address this disparity. However, it will take time and more needs to be done to promote pine as a product globally so that perceived quality differentials are quashed.

## **Need for whole log solutions**

New Zealand's large-scale export successes are Fonterra and Zespri. By contrast, the two industries which are perceived to underperform the most are meat and wood processing. The absence of a single desk distributor is one difference between the performers and the non-performers.

Another difference is that the main breakdown stage of processing produces multiple products of variable value. At the primary breakdown stage of wood processing you are producing chip, sawdust, bark, sapwood, core wood and to be economic, you must produce a consistent sale for each component. It is uneconomic to perform this breakdown process without the whole log solution. This complexity has perhaps contributed to the mind-set that it is easier just to sell the log.

However, the landscape in this area is changing with increased demand for clean fuel as wood pellets and breakthroughs in the use of wood waste for biofuel. I believe that both biofuels and wood pellets have the potential to be for the wood products sector what the sausage is to the meat industry.

## **In-country sales**

The New Zealand wood products industry exhibits minimal, if not non-existent, presence in the countries that it sells its products. This is a function of scale, with most in the industry using local agents to represent their interests. The issue with this is not the cost of commission.

The real cost is the lack of understanding our industry has of our customer needs and our responsiveness to how these needs are changing. It also reflects an inability to develop the relationships necessary to become meaningful to an end-user. This is in contrast with our global competitors who command a much greater presence in-country.

## **Proximity should be an advantage**

Much is made of our proximity to a vast natural resource representing a competitive advantage. However, it is my submission that we have yet to turn our proximity to resource into an advantage. In fact, I would argue that

proximity to log supply in New Zealand's case could be seen as a disadvantage for some domestic processors because you are a captive customer with no alternative other than to accept local logs. By contrast, in China for example, a sawmill has the choice of logs from Russia, North America, South America and Europe.

The captive nature of the domestic industry has produced rigidity into supply agreements and a lack of transparency in the price setting mechanism. Supply conditions are different between domestic and offshore log customers. The domestic market log supply contracts are generally agreed quarterly and the export market price is set monthly. This fact, coupled with increasing log price volatility, creates a significant risk premium for the domestic wood processor.

## **More flexibility**

Under no circumstances would I advocate preferential treatment to local industry. The reality is New Zealand has sold its exotic forests to foreigners who rightly expect to maximise their return. Equally, the forest manager has the responsibility to act in the best interest of the forest owner. None of these is rewarded for promoting downstream value-added business in New Zealand. However, I believe we can all benefit from reassessing the standard supply agreement process to enable greater contractual flexibility.

This would necessitate greater price transparency and enable New Zealand based wood processors to engineer a contractual supply arrangement which puts them on a level footing with their competitors – the foreign sawmills that process a New Zealand log. With supply conditions aligned I am convinced that this country's wood processors can compete and scale can be achieved, either organically or by investor attraction to more stable returns.

## **The trumpets of change**

So have the trumpets of change sounded? That is probably premature – we are still in the 'I have a dream phase', but I am optimistic. Along with the declining cyclical headwinds there are also some trends emerging in the industry which are promising. One of these is the increasing level of iwi ownership of forests and the leadership that has been shown there to promote domestic processing.

Energy costs offshore and the availability of renewable energy in New Zealand are already starting to drive demand for primary breakdown of the natural resource in this country rather than offshore. I see this as a trend that is in its infancy. In addition, increasing residue demand encouraged by the green energy sector helps complete the circle for wood processors in terms of finding whole log solutions for product. Finally, there is a resolve across a number of sectors to make wood processing work and this has led to a spirit of cooperation which can only be positive.

*David Turner is the Managing Director of Sequel Lumber in Kawerau.*

**Paul Charteris**

## Primary industries can contribute to a material world



*Not that long ago we replaced glass milk bottles with plastic and now a team of researchers want to get rid of this plastic as well, sort of. Scientists at Rotorua-based Crown Research Institute Scion are working on ways to convert biological materials such as wood, agricultural and horticultural residues or municipal waste, into materials including plastics.*



It may seem curious that effort is being spent developing biomaterials such as bioplastics. It is a change which has parallels in other industries. Just as Fonterra creates a variety of foods including new-generation functional foods using milk proteins and fats, Scion's scientists are creating new materials from wood, other renewable plant-based sources and common waste streams.

Two types of materials that Scion's scientists are particularly interested in are wood plastic composites and bioplastics. These biologically sourced plastics would look, feel and behave much the same as currently used plastics which are mostly made from imported petroleum ingredients, but have a very different start to their life.

The raw materials to make these new bio-based materials would be grown on farms or in forests. They could open new markets for some of New Zealand's primary industries or safeguard current markets by demonstrating a commitment to reducing our environmental footprint. At the end of life, these bioplastics could degrade away in landfills or specially designed industrial composters, or they can be designed to be durable.

### **A growing market**

According to a January 2012 *Global Technology Forum* article, the worldwide bioplastics market is expected to reach revenues of over \$2.5 billion in 2018 with

annual growth rates of around 18 per cent a year. Putting aside the guessing game in market growth, it is clearly a growing market. That is important for countries with considerable bio-based economies like New Zealand. It is even more important for countries that export, or aspire to export, to the highest value, eco-conscious world markets.

Several forces are combining to encourage growth of the world's bioplastics industry. These include consumer preferences, corporate commitment, government mandates and support. Major corporations developing high profile products are the most visible face of the bioplastics industry. Coca-Cola and PepsiCo have opened a bioplastics battleground in the cola wars.

Both companies are trying to outdo each other to produce the world's most environmentally-friendly plastic bottle. In 2009, Coca-Cola introduced the PlantBottle and by December 2011 they had sold more than 10 billion units. The PlantBottle contains 30 per cent plant material sourced from Brazilian sugar cane. PepsiCo has been successful in creating a 100 per cent plant-based bottle. PepsiCo has access to bio-based waste plant materials from its major processing plants including oat hulls from Quaker Oats, orange peel from Tropicana, and potato peel from Lays.

### **Wood fibre value**

There are a number of players in the global bioplastics industry. Research and technology companies such as Scion are developing technologies on behalf of primary industry partners or for licensing to manufacturers. Some of the larger plastics manufacturers have their own research and development facilities. Agricultural companies have long-standing expertise and technologies related to sugars and starches and are beginning to move into the biomaterials market.

In this arena, Scion's focus for the past 10 years has been to develop bioplastic technologies using New Zealand resources or residues to enhance performance over what is currently available. We have spent 70 years processing wood which is a material we know extremely well. On behalf of commercial clients, we have worked on many wood composites including glulam, particle boards, plywood, LVL and medium density fibreboard. It was logical that when Scion began to develop composite materials based on plastics, we almost immediately began introducing wood fibres into the mix using familiar technologies developed from wood composites research.

The addition of wood fibres to create wood plastic composites has advantages over synthetic fibres such as glass in terms of lower cost, sustainability, end-of-life options and their relatively low density. The addition of either wood flour or wood fibres can reduce the cost of plastic, with wood flour resulting in the greater cost reduction.

This lower cost has been one of the main reasons for introducing wood flours into plastics since the 1970s. The addition of wood flours make plastic stiffer but not always stronger. The addition of fibres achieves both.

### **Not new products**

Wood plastic composites based on wood flour are not new, as they have been around since the 1970s but really hit the market in the early 1990s. The global market for wood and other natural fibre plastic composites was an estimated 2.4 million tonnes and predicted to nearly double to 4.6 million tonnes in 2016. Annual growth in the market is expected to continue at 10 per cent to 40 per cent a year for the next few years.

At an estimated 1.8 million tonnes, building which is mainly decking, accounts for the lion's share of the global market. Wood plastic composite decks have high durability and low maintenance compared with traditional wooden decking. They are designed to have a look and feel similar to wood and can be engineered to resist fungal rot and UV degradation. Wood plastic composites can be moulded into many shapes and forms through the extrusion and injection processes.

It will be interesting to see what role wood plastic composites play in the Christchurch re-build. Modern eco-friendly construction projects are starting to incorporate these materials into designs where local government or consumers are demanding a high degree of environmental accountability.

### **Strength a value**

The second largest segment of the natural fibre-plastic composite market is automotive at 360,000 tonnes, with infrastructure and industrial uses both at 140,000 tonnes. Strength is an important property in automobile applications and so fibres from agricultural sources such as hemp, sisal and flax are used rather than wood flour. Generally, these agricultural fibres suffer from variability in supply, quality and in some instances they absorb water.

Scion's scientists are betting that, while these wood



flours or fibres are often mixed with conventional plastics, the real market growth opportunity will be with wood bioplastic composite materials. These will be products from renewable sources which offer significant marketing advantages to eco-conscious consumers.

This is a major advantage to New Zealand manufacturers who export products considerable distances to major world markets and want to minimise their carbon footprint. In addition to cost, sustainability and end-of-life options, wood plastic composites remove the need for traditional preservative treatment of wood such as copper chromate arsenate.

## Wood fibre pellet technology licensed

The difficulty of feeding and processing wood fibres in plastics processing machines, such as extruders and injection moulders, has held back the widespread inclusion of wood fibres in plastics. Wood fibres are difficult to handle as they are fluffy like cotton wool, and wood chips are too coarse to be used in a plastics extruder. Wood flours are regularly used, but do not greatly add to strength of traditional plastics. Wood flour more or less fills a plastic whereas long, natural wood fibres reinforce the plastic giving it greater strength.

Research has shown that wood flour could increase the maximum tensile stress of polypropylene by up to 45 per cent. Scion's wood fibre technology increased this same measure by 118 per cent.

To enable the full reinforcement capacity of wood-based fibres, problems such as handling and feeding, insufficient fibre dispersion, adhesion to the plastic matrix and length retention during processing needed to be solved. To overcome these, researchers have developed a thermoplastic binder which holds the wood fibres together in a pellet that can be poured in an extruder and then the reinforced compound fed into an injection moulding machine.

## Licensing agreements and patents

Scion has negotiated a licensing agreement with global wood manufacturer Sonae Indústria Group for the production and sale of the wood plastic pellet technology. The licence gives the Sonae Indústria group an exclusive licence to commercialise the technology in Europe. They have been interested in this technology for a few years. Successful trials with plastic processing operations have given them the confidence to introduce this new material to Europe.

As one of the world leaders in wood technology, with over seven million tonnes of wood processed annually, Sonae Indústria wants to have an important role in the future of the wood sector. The main advantage of these new wood plastic pellets is the strength they give to traditional polymers. So much so that Sonae Indústria has named the technology's product WoodForce.

While the first commercial applications of the technology are likely to appear in Europe, the intellectual property is retained in New Zealand, with Scion having filed international patent applications. Scion developed



**Kiwifruit with a spife made from bioplastics**

and patented this technology under its biofibre research programme funded by New Zealand's former Foundation of Research Science and Technology which is now the Ministry of Science and Innovation.

## Everything kiwifruit

Scion and Zespri are working together to develop a novel bioplastic product to retail with the kiwifruit. These innovations are aimed to eco-conscious consumers and will hopefully enable Zespri to maintain and grow market access.

The spife, a spoon-knife utensil for cutting and eating kiwifruit, which is sold with the fruit, contributes three per cent to Zespri's total carbon footprint – too much for the eco-conscious company that markets its products around the world. Scion biopolymer scientist Martin Markotsis has helped develop the biospife made from bioplastics, such as polylactic acid, mixed with formulations of waste kiwifruit, including pulp, skin and hairs.

The biospife can be formulated as a solid colour or, depending on the preference of the market, retain flecks of kiwifruit material that give it a natural appearance and a marketing point of difference. The biospife is both renewable and compostable. In an industrial composting facility a spife

continued on page 28>>

Ian Williams

# Maize silage and its benefits

*Ryegrass clover pasture continues to be the backbone of New Zealand dairy farm systems. However maize silage has become increasingly important as farmers aim to maintain production levels and the reproductive performance of their high genetic merit herds. This article outlines the main benefits of growing and feeding maize silage, management steps for maximising maize silage yield and quality, and how to achieve a high milk response rate when feeding maize silage.*

## Benefits of growing and feeding maize silage

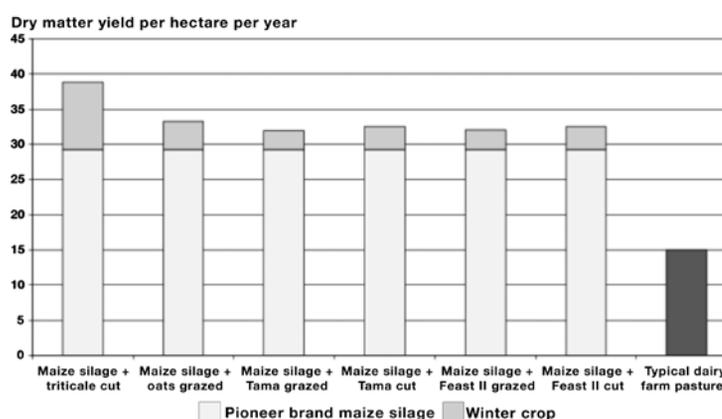
On many farms pasture yield appears to have reached a plateau. Maize allows farmers to maximise the return from their high value dairy land by harvesting more dry matter from every hectare. Each year Pioneer brand seeds plant maize silage trials throughout New Zealand as part of their maize hybrid evaluation programme. Two-year average yields are shown in the table. The information was collected from small plots and strip trials mainly located in paddocks on commercial farms.

### Average maize silage trial yields by district

	Maize silage yield Tonnes of dry matter per hectare	
	Average yield	
Northland	347	22.40
Waikato	2000	24.38
BOP	295	25.80
Taranaki/lower North Island	841	21.60
South Island	347	21.61
National weighted average	3830	23.45

A replicated two-year forage production trial conducted in the Waikato showed maize silage followed by a winter crop could produce an annual dry matter yield of over 38 tonnes of dry matter per hectare. Even on farms harvesting more than 15 tonnes of dry matter per hectare of pasture each year, planting 20 per cent of the farm in maize silage can lift the overall farm dry matter yield by more than 15 per cent.

Maize is an ideal break crop in a pasture renewal process. The cultivation process allows farmers to apply fertiliser, incorporate lime and solve drainage problems that may have been affecting pasture persistence. Cropping removes the normal feed source for pasture pests such as black beetle, Argentine stem weevil and pasture nematodes. This interrupts



### Total annual dry matter yields for maize and a range of winter crop options

their breeding cycle and reduces insect pressure on seedling plants during the pasture renewal process.

### Substitution

While most forage crops must be fed when mature, a main benefit of maize silage is that if it is well compacted and sealed, it can be stored on-farm and used to fill genuine feed deficits. Feeding supplements results in pasture substitution and this reduces grazing pressure, lifting post-grazing residuals.

Forages such as maize silage have higher substitution rates than concentrates and can be used to manipulate farm pasture cover levels, reducing over-grazing and improving pasture persistence. The combination of maize silage and a well designed stand-off pad with feeding facilities allows farmers to keep cows off wet pastures without compromising production or animal welfare.

A two year on-farm study showed that maize silage crops could be grown in paddocks with a history of effluent application without the need for any additional fertiliser. Growing maize on effluent paddocks reduces the cost of maize silage by producing high maize silage yields with reduced crop input costs.

### Typical cost of maize silage dry matter

	Maize silage yield tonnes of dry matter per hectare in the stack							
	16	18	20	22	24	26	28	30
Cost with full fertiliser input cents per kilogram of dry matter	24.1	21.4	19.3	17.5	16.1	14.8	13.8	–
Cost in effluent paddock cents per kilogram of dry matter	–	15.7	14.2	12.9	11.8	10.9	10.1	9.4

The combination of high stocking rates and high levels of imported feed has seen nutrient levels rise on many New Zealand dairy farms. High soil potassium has been associated with increased pasture potassium. This has important implications for animal health as high potassium pasture can reduce calcium and magnesium absorption in dairy cows and increase susceptibility to milk fever and grass staggers. At 20 tonnes of dry matter per hectare, a maize silage crop will remove around 256 kg of nitrogen, 52 kg of phosphorus and 240 kg of potassium, therefore reducing nutrient build-up.

Research has shown maize silage has a nitrogen use efficiency approximately three times greater than that of pasture. Maize has a rooting zone of 100 to 150 cm, substantially greater than pasture species, a water use efficiency up to twice that of perennial ryegrass on an annual basis and up to three times greater on a summer seasonal basis. The superior water use efficiency of maize over pasture species is an important consideration over summer. As the cost to pump water rises there is increasing pressure on New Zealand's water resources for irrigation, power generation and recreation.

Yield and water use efficiency of different forages grown in different seasons in New Zealand and Australia

Forage	Yield tonnes of dry matter per hectare	Water use efficiency kilograms of dry matter per hectare per mm	Plant type
Perennial ryegrass New Zealand and Australia	18.7	16.2	C3
Fescue Australia	21.8	20.0	C3
Lucerne New Zealand and Australia	20.3	18.8	C3
Clover red, white and Persian New Zealand and Australia	14.8	18.5	C3
Maize Australia	25.5	34.5	C4
Kikuyu Camden, Australia	25.0	32.0	C4
Sorghum Camden, Australia	18.0	28.0	C4

### Effect of feed source on nitrogen output in milk, dung and urine in absolute and relative terms

Type of silage	Nitrogen intake Kilograms of nitrogen per cow	Nitrogen output Kilograms of nitrogen per cow (percentage intake)		
		Milk	Dung	Urine
Lucerne	37	6 (16)	8 (22)	23 (62)
Pasture	24	6 (25)	7 (29)	11 (46)
Cereal	16	6 (38)	5 (31)	5 (31)
Maize	12	6 (50)	3 (25)	3 (25)

Maize is a low crude protein feed stuff with an average of 7.5 per cent crude protein. Feeding maize silage dilutes dietary protein levels and reduces the excretion of nitrogen, especially urinary nitrogen. This is important because it is estimated that 69 per cent of the nitrogen loss on a typical Waikato dairy farm is from cow urine.

### Maximising maize silage yield

Maize silage is established in the spring with the bulk of crops being planted in October and November. Where possible maize paddocks should be selected in the early autumn. Perennial weeds should be controlled at this time to reduce the risk of them being spread during cultivation.

Maize does not perform well in waterlogged soils. Waterlogging can also encourage weeds such as willow to invade the crop. Wet areas should be drained to enable earlier cultivation, better weed control and a reduction in nutrient leaching. A soil test should always be taken with a core to the depth of cultivation – normally 150 mm.

### Selection of hybrids

Hybrid selection is important because the hybrid planted will determine maize silage yield, quality and the amount of time from planting to harvest. Maize matures according to heat unit accumulation. Longer maturity hybrids tend to have a higher yield potential, but require more heat and will therefore take more days to reach silage harvest maturity. Choosing a hybrid which is too short will result in a lower yield, whereas choosing one too long will result in delayed harvested.

Hybrids must have a high total dry matter yield as well as a high grain yield to achieve maximum metabolisable energy yield per hectare. Grain yield is important as two-thirds of the energy in maize silage comes from the grain.

Modern maize hybrids have enhanced stress tolerance making them more adaptable to higher planting populations. A study conducted in 2003 examined the effect of a range of established plant populations of 85,000, 100,000, 115,000, 130,000 and 145,000 plants per hectare on the yield and quality of 12 Pioneer brand maize silage hybrids grown at 13 locations over two seasons.

As plant population increased, dry matter yield increased significantly. There was no significant effect of population on nutritional parameters except crude protein,

with the highest population plots having slightly lower crude protein percentages.

### Cultivation

It is recommended that growers always plant insecticide-treated maize seed. Spraying out pasture reduces the number of cultivation passes needed to achieve a desirable seed bed. It also eliminates pasture re-growth and reduces turf clods on the seed bed surface. This, in turn, enhances the performance of chemicals for weed control. Fertiliser requirements will vary greatly depending on the history and fertility status of the paddock. High fertility long-term dairy pastures, including those which have had a history of effluent application, may require no fertiliser. On the other hand, continually cropped paddocks or run-out sheep and beef farm pastures sometimes require capital fertiliser applications.

Where the area is being cultivated, aim for a crumb size no larger than a maize seed. A well-prepared seed bed enables weed control chemicals and insecticides to give optimum results, enhances crop establishment and allows planting machinery to work more accurately. A small number of growers are successfully establishing maize by reduced tillage methods. Hybrid maize seed must be precision planted. Starter fertiliser can be drilled at planting time if the soil test result indicates it is required.

### Controlling weeds

Good weed control is important. Pre-emergent herbicides will be most effective if applied within 24 hours of planting. The type of post-emergent weed control herbicide used is determined by the type of weeds present. Maize crops should be walked every two to three days during the early part of the growing season. Keep an eye out for insect or bird damage, weeds and signs of nutrient deficiencies.

Around four weeks after planting, conduct a deep nitrogen soil test to determine if additional nitrogen is required. Side dressing normally occurs around six weeks after planting when the maize is knee high.

### Harvest management

The ideal time to harvest maize silage is when the whole plant dry matter is between 30 per cent and 38 per cent. Precision chopping is necessary to achieve top quality maize silage. The ideal chop length is 10 to 15 mm. This is a theoretical chop length and silage will contain some particles which are shorter or longer.

Some longer particles are beneficial as they stimulate the rumen of the animal being fed. Where silage is very dry, greater than 38 per cent dry matter, the chop length should be decreased to between five and nine millimetres. In the case of very wet crops which are less than 30 per cent dry matter, the chop length may be increased up to 20 mm.

### Processing the grain

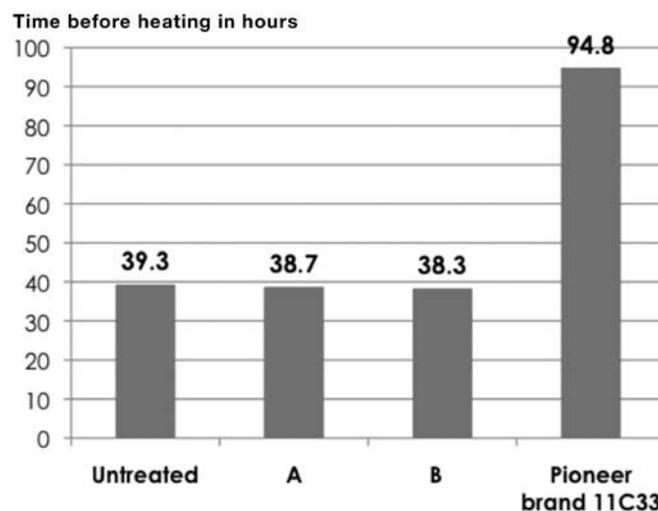
Maximising maize grain digestion is important as maize grain contains 70 per cent more metabolisable energy than the

green part of a maize plant. The yellow fibrous outer covering of the maize kernel, the pericarp, is one of the least digestible parts of a maize kernel. Fracturing the kernels allows the rumen bacteria access to the highly digestible starch inside the grain. Research has shown that over 22 trials, cows fed diets containing processed maize silage produced an average of 0.5 kg more milk per day than those fed diets containing unprocessed maize silage.

While all crops will benefit from plant processing that breaks up maize kernels, gains are even greater in crops where the grain is mature. Currently, the New Zealand recommendation is to have 99 per cent, with a target minimum of 80 per cent, of the kernels broken into at least four pieces.

### Inoculate bacteria

High quality silage inoculants contain strains of beneficial bacteria which can reduce silage storage and feed-out losses. New Zealand research has shown that maize silage inoculated with Pioneer brand 11C33 stays cool for 55 hours longer when compared to an untreated control. There was no statistical difference between inoculants A and B and the untreated control.



Fermentation is an anaerobic or oxygen-free process. The aim of compaction is to remove the air from the maize silage. Compaction is a function of weight, rolling time and the depth of the layers of chopped maize. Wheeled vehicles have a higher weight per surface area and achieve better compaction than tracked vehicles of an equal weight. Increasing the weight of vehicles or the number of vehicles will help to avoid silage pile-ups.

Seal the silage stack quickly and weigh the cover down with sand bags or tyres that are touching. The edges of the stack should be sealed with sand or lime.

### Maximising milk response rates

Farms system research, coupled with practical farmer experience, has shown there are a number of ways to maximise milk responses to maize silage.

## Minimise wastage, maximise pasture

Good stack and feed-out management will ensure that storage losses are minimised. Aim to keep the face of the maize silage stack tight throughout the feed-out period. You should not be able to push your fingers into the stack any further than the depth of your fingernails. Maize silage which is loose allows air to penetrate the stack. Aerobic or oxygen-loving bacteria break down plant material producing waste products including carbon dioxide, heat and water. Silage quantity and quality are therefore decreased.

Vary the maize silage feeding rates to ensure pasture harvest is maximised. Avoid pasture pugging and over-grazing, which can result in substantial long-term pasture dry matter yield losses. Control pasture surpluses to ensure that you maintain pasture quality. This is particularly important in the late spring as ryegrass enters its reproductive phase and quality drops very rapidly.

## Match feed to stocking rate

If feed supply is too high, it will be difficult to maintain grazing pressure and pasture yield and quality will be sacrificed. If feed supply is too low, the per cow performance will be compromised and a high proportion of the feed eaten will be used for animal maintenance rather than milk production.

Research has shown that many farmers will get their best return from using supplements to extend lactation length by either milking longer in the autumn or calving earlier in the spring. Research conducted at the Waimate West Demonstration Farm shows that maize silage can give excellent returns at this time.

*Ian Williams is a forage specialist for Pioneer brand seeds.*

## >> Primary industries can contribute to a material world continued from page 24

will degrade in under three months. It will break down in garden compost, but at a slower rate.

### Bioplastics from waste fruit

Currently, thousands of tonnes of kiwifruit not suitable for fresh sales are fed to livestock each year. This is a lost opportunity for the industry. These raw materials could be converted into bioplastics and used to make a range of innovative new products. Creating bioplastics based on kiwifruit residues is a win-win for everyone. Excess fruit material is converted into a higher value product, the carbon footprint for Zespri is reduced and there are clear marketing benefits.

The biospife has developed beyond the prototype stage and Zespri looks to commercialisation. Now Dr Markotsis and his team have begun to develop other kiwifruit-based bioplastic products such as fruit packaging materials.

### Biofoams

At around five million tonnes a year, there is considerable global demand for expanded polystyrene. It is used mainly for packaging and thermal insulation. Its low density makes it ideal as a packing material where additional weight adds to transport costs. Although it can be recycled, economics and logistics are usually not favourable and most ends up being put into landfill.

Its excellent low density properties become a liability in landfills where it takes up a considerable amount of space. Expanded polystyrene is made from petroleum sources and does not degrade. For this reason it is banned from landfills in many parts of Europe and the United States. A biodegradable alternative to expanded polystyrene, with the same low density, strength and insulating properties, would be useful for New Zealand exporters.

Working for the Biopolymer Network Ltd – a joint venture between Scion, AgResearch and Plant & Food –

scientists have been working on an environmentally friendly alternative to expanded polystyrene. The main criteria is that it can be produced on existing machines, is derived from renewable plant-based resources, and is biodegradable at the end of its lifetime.

### Bio foam

After more than six years of research an environmentally-friendly biofoam, based on polylactic acid, has been developed. A range of laboratory and industrial trials have produced moulded parts as varied as helmet cases and fish boxes. The polylactic acid foam technology uses commonly available polylactic acid grades and carbon dioxide gas as a blowing agent to make expanded beads which are hard plastic pellets transformed into beanbag-like beans. The breakthrough is significant in that the new foam can be made from commercially available grades of polylactic acid and in existing plastics manufacturing machinery.

The newly developed foam meets the major requirements for packaging, it is low density and has excellent thermal insulation, strength and stiffness. This foam has a range of potential applications. Early adoption applications currently being explored include fish-box packaging for export. New Zealand's seafood, agricultural and horticultural products could one day be exported in a more environmentally friendly packaging.

We may be a few years away from having every milk bottle or packaging box made from sustainably grown natural and recyclable materials. In the meantime, Scion's scientists will continue to devote their collective brainpower as well as wood, corn and kiwifruit leftovers to the challenge of creating the materials of the future.

*Paul Charteris is a science communicator for Scion, Rotorua. For more information contact Alan Fernyhough 07 343 5428 Alan.Fernyhough@scionresearch.com or www.scionresearch.com.*

**Tom Wilson and Carol Stewart**

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## The 2011 Puyehue-Cordon Caulle volcanic eruption Some lessons for New Zealand



*This is a report on a recent three-week visit to the Puyehue-Cordon Caulle volcano in northern Patagonia. New Zealanders will remember the eruption of this volcano in June 2011 as the event which shut down air traffic in Australasia at the time. Tom, Carol, Heather Bickerton and David Dewar were invited by Argentine researchers and Segemar, the Argentine geological survey, to visit the area affected by ash fall from this eruption to carry out an impact assessment and to observe the progress of the recovery.*

The Puyehue-Cordon Caulle volcano started showing signs of unrest back in April 2011, followed by a large eruption in June. This event erupted over three cubic kilometres of ash into the atmosphere. Due to the latitude of the volcano, the ash plume was blown around the earth and eventually arrived over Australasian airspace five to seven days later. Only a small fraction of ash remained airborne. Thick ash falls were deposited across 100,000 square kilometres of Chile and Argentina, leading to a range of effects.

In February 2012 we travelled to South America to study the aftermath of the ashfall in northern Patagonia. This area has similar volcanoes and is comparable in latitude to New Zealand, and therefore is alike in climate, ecology and land use. This makes it a valuable case study for predicting the consequences of a volcanic eruption in this country.

The purpose of our trip was to –

- Assess the effects of the eruption on critical infrastructure in urban areas
- Assess effects on agriculture including on livestock health, evacuation, adaptations in farming practices and time-scales of recovery and rehabilitation of farmland
- Investigate the emergency management of the eruption crisis and identify important lessons learned
- Examine the phenomenon of re-mobilisation of ash deposits by wind and fluvial action
- Assess public health implications of the eruption.

This work has been undertaken as part of the New Zealand volcanic impacts research group of researchers from Canterbury, Massey and Auckland Universities and GNS Science. We usually travel to volcanic disaster zones nine to 12 months after eruption events. This gives time for the effects of the disaster to manifest, improving the quality of research observations and recordings. It also ensures we do not detract from emergency response efforts, which is an important ethical consideration in disaster research.

### **The explosive nature of these eruptions**

Our team has previously looked at two large silicic eruptions in Patagonia. The 1991 eruption of Volcán Hudson and the 2008 Chaitén eruption. Although both these volcanoes, and also Puyehue-Cordon Caulle, are located in Chile, the

prevailing westerly winds in the region result in ash plumes being dispersed to the east over Argentina, and therefore the majority of effects are also observed in this country.

Silicic eruptions erupt magma which is very high in silica with the result that their eruptions are extremely explosive. The higher the silica content of magma, the more viscous or sticky it is. As magma rises towards the earth's surface during a volcanic eruption, the pressure reduces and gases in the magma decompress. These gases want to expand. However the stickier the magma, the harder it is for magmatic gases to escape from the magma melt. The only way for them to escape the magma is to explode the magma apart. This is the process which leads to explosive eruptions.

Silicic eruptions usually erupt large volumes of volcanic ash and larger size material. To give an idea, at least three cubic kilometres of material was erupted from Puyehue-Cordon Caulle in 2011. The total volume erupted from Mt Ruapehu during the 1995 and 1996 eruptions, which had a lower silica content in the magma, was only about 0.1 cubic kilometres.

### **Effect on agricultural land and livestock**

New Zealand has a number of volcanoes which are capable of silicic eruptions, such as the Taupo and Okataina volcanoes. They are known to have erupted frequently in the past and will most probably erupt again in the future. Even our more frequently active cone volcanoes, such as Ruapehu, Taranaki and Tongariro, have occasionally experienced large volume, highly explosive eruptions. So it is worth preparing for a future eruption.

#### **Wind blown ash on farmland**



**Ash to a depth of 25 centimetres**

There are other similarities between New Zealand and northern Patagonia. These include the use of ryegrass and clover for pastures, and the types of cattle and sheep farmed such as Corriedales and Merinos.

Areas relatively close to the volcano experienced ash fall depths of 20 to 100 centimetres. This smothered grazing vegetation, leaving animals with almost nothing to graze on so they had to be fed supplements. Some could be slaughtered for household use, but several thousand were evacuated from the heavily affected areas. In areas further downwind from the volcano around 100 to 200 kilometres away, approximately 100,000 livestock were evacuated or sold due to the lack of access to food and water.

## Counting sheep

Evacuation management was challenging – as Argentina does not have good animal census records, the number of livestock exposed to the ash falls were not known accurately. In New Zealand we have a reasonably good record of livestock numbers and where they are located due to our quality control measures, such as the TB database. However Argentine authorities were not sure, for example, how many trucks would be required to evacuate livestock or how much supplementary feed would be needed. It was also hard to carry out the usual tasks, such as mustering, during the extreme ash fall.

The agricultural land between Jacobacci and Bariloche 90 to 200 kilometres from the volcano received up to five centimetres of fine ash. Extensive low-intensity sheep, cattle, horse and goat farming is concentrated in the grassland valleys as the rest of the landscape is too dry. Preceding the ash fall there had been six years of drought with an average rainfall of just eight millimetres a year. This compounded the effects of the ash and undoubtedly increased the livestock losses. Jacobacci municipality staff estimated that livestock losses after the ash fall were around 40 per cent to 60 per cent for a total regional herd of 225,000 sheep and 60,000 goats. The main problems were starvation, dehydration, rumen blockages and tooth abrasion.

Tooth abrasion from animals eating ash covered vegetation led to further issues with foraging and grazing, causing additional reliance on supplementary feed and premature aging of the animals. Fleece prices are also low in the region due to ash collecting in wool, and usable wool has dropped from around 50 per cent per fleece to between

25 and 30 per cent. Sheep birth rates were also down from 60 per cent to between 10 and 30 per cent as mothers were malnourished and stressed. Continuing wind re-mobilisation of ash deposits is prolonging these effects.

## Problems to face

In the early stages many farmers realised that there would be problems with access to feed. They therefore started slaughtering their animals for their households or selling them before their condition worsened.

For many farmers in this region there are likely to be significant difficulties, both in determining the best course of action in managing the effects of the eruption and in finding the necessary resources to act. However, we observed that local farming advisors and scientists are aware of the situation on farms. Assessment and research programmes are active in the area, aimed at quantifying where recovery efforts should be focused and what strategies might be most effective.

In general, efforts have been aimed at encouraging diversification of pastoral production systems to boost production and build resilience. The value of rapid impact assessment, and a well-considered recovery programme which helps farmers to recover effectively, are important lessons for New Zealand to consider.

Compounding the problem is that unconsolidated ash deposits are at risk of re-mobilisation by the action of wind and water. Ash deposits have already been extensively re-mobilised by the strong prevailing westerly winds in the region. The towns in the dry flat plains, such as Jacobacci, have been particularly affected by windblown ash. Schools in the region were closed for almost four months after the

Thick ash covering pasture



eruption and during windy conditions townspeople have little choice but to remain indoors.

### **Critical infrastructure**

Volcanic eruptions can produce a wide range of hazards. Although phenomena such as pyroclastic flows and surges, sector collapses, lahars and ballistic blocks are the most destructive and dangerous, volcanic ash is by far the most widely distributed eruption product. Although ash falls rarely endanger human life directly, threats to public health and disruption to critical infrastructure services, aviation and primary production can lead to significant societal impacts. Even relatively small eruptions can cause widespread disruption, damage and economic loss.

A further theme for our visit was observing critical infrastructure performance during the ash fall. Like New Zealand, the Patagonian landscape is populated with towns dispersed over large geographic areas, making for long corridors of infrastructure such as power lines and roads. Similarly, there is a focus on primary industries and tourism being the mainstays of the economy.

Our group focused on three case study areas. The first was close to the volcano on the Argentine side of the border. This area was heavily affected by ash fall and had 20 to 30 centimetres of ash over a period of about 10 to 14 days. Since then, there have been intermittent ashfalls. In a way, these are like the aftershocks of earthquakes. There is not just one big event, but a protracted one which extends effects over a period of time. The eruption sequence could be described as

being similar to the earthquake sequence being experienced in Canterbury since September 2010.

### **Electricity networks**

The ash fall caused widespread disruption of electricity supplies in the study area. As we have observed for other eruptions, the predominant effect was ash contamination of electrical distribution lines and substation insulators which induced current leakage and insulator flashover. This is when ash of sufficient electrical conductivity accumulates on an insulator and can generate an unintended electrical discharge. This propagates itself around or across the surface of the insulator and is known as flashover.

Continual tripping of switches due to flashovers, combined with the presence of fine ash in switches, led to abrasion of the metallic conductors which reduced the contact between electrodes, in turn reducing their functionality. This required replacement of the switches.

Thermal generation facilities also suffered significant disruption in some areas, mainly due to ash blockage of air intakes. These effects combined to leave communities without power for up to 20 days in some places, and power outages for up to six months after the eruption.

### **Effects of ash fall on water supplies**

Water supplies across the region also experienced a variety of disruptions due to the ash fall. In very arid areas such as Jacobacci, secure groundwater wells are exclusively used as water sources. While above-ground equipment such as well-head pumps can be damaged by airborne ash, in Jacobacci

**Dumping the volcanic ash**



the pumps were fully enclosed and the system proved to be resilient. However, in other areas, water supplies are drawn from springs and streams as well as from Lago Nahuel Huapi, a very large lake which is over 400 metres deep.

Stream-fed water supplies were particularly prone to damage as ash was washed into intakes and clogged up screens, sand traps and filters, and also interfered with disinfection treatment of the water. The ash had to be dug out manually, and problems have continued in rainy weather.

A large number of chemical analyses were performed to determine whether the release of chemical species from the surface of the fresh ash fall contaminated the water supplies. Although characteristic volcanic signals were observed, levels of chemical species associated with ash fall such as fluoride, iron, aluminium and manganese were not of any concern for public health as they were well below drinking water guideline levels.

### **Transportation networks**

There were problems with the transportation networks, visibility being the main difficulty. There were also problems with traction when the ash blocked roads, which led to a significant demand for the towns to be cleaned up quickly, partly because it was stopping tourism into the area. It is very challenging to deal with 20 to 30 centimetres of pulverised rock which has fallen on your town.

Local councils used heavy earth-moving equipment to clean up the fine-grained ash and they tried to coordinate residents to progressively clean their properties and businesses. This was very challenging with some people leaving or not having adequate resources to clean. Coordination of the clean-up effort was still a problem for many towns nine months after the eruption began.

The most severe disruption to transport networks in the depositional area was the closure of Bariloche airport. It closed at 5:00 pm on 4 June, just before the arrival of the ash plume. The airport did not receive an official warning, but was advised of the impending arrival of the plume by a pilot on an incoming flight. The airport was closed for a month for the clean-up operations.

During this period, approximately 1,000 tonnes of ash were removed from the airport, most of which was disposed of by filling in hollows and depressions in the immediate area. A further initiative has been the installation of irrigation systems surrounding the runway to encourage grass growth to trap the ash and suppress wind re-mobilisation.

Even though the airport re-opened for business on 5 July 2011, it was many more months before the country's two major airlines resumed regular services to Bariloche as eruptive activity continued at Puyehue-Cordon Caulle. The decision to fly rests with individual airlines, and in the face of uncertainty with standard operating manuals offering no specific advice on volcanic ash, most opted on the side of caution.

Driving conditions in the region remain treacherous at times due to airborne ash, and official advisories are still in place. Strategies to reduce ash re-mobilisation in built up areas

include restricting vehicle speeds and dampening ash with water. The region is in general well-equipped to cope with driving in winter conditions, and this probably conferred a degree of resilience. The formation of thick pumice rafts on Lago Nahuel Huapi disrupted boat transport on the lake for up to 11 days after the eruption. This caused problems for the movement of people and livestock out of farming areas on the western shores of the lake which are not accessible by road. This summary of effects contains important lessons that New Zealand communities will need to consider in a future volcanic emergency.

### **Emergency management**

The eruption of Puyehue-Cordon Caulle has been a complex emergency to manage and offers a range of lessons for emergency management. At the time of our visit, the focus in Bariloche appeared to be moving on from the immediate necessities of clean-up operations and managing ash fall, to using the lessons from the eruption to improve infrastructure resilience and support the recovery of local industries. There were still significant challenges in dealing with continuing re-mobilisation of ash causing problems for public health, agriculture and economic impacts on the tourism sector.

One of the major lessons from managing the Puyehue-Cordon Caulle eruption is that local and national authorities must be able to communicate reliable and timely information to affected communities. Communities will be anxious about possible health effects and what effect it may have on their property, farms and animals. This is a challenge, as volcanic eruptions are inherently complex. They are difficult to forecast when and how large an eruption may be.

Once an eruption does occur, the direction in which ash is distributed is dependent on prevailing winds which may change frequently. Conditions at the volcano mean that the properties of the ash may also change. This requires scientific monitoring, which then must be communicated to the public in a form which is understandable and useful to help them to make informed decisions. This is very similar to the situation in Canterbury, where the complex earthquake sequences have been a challenge for scientists to communicate useful information.

### **New Zealand application**

We collected a large number of soil and ash samples for physical and chemical analysis. These results will be shared with our South American counterparts, but will provide valuable insights of what may happen in New Zealand following a future volcanic eruption. Our broader observations and findings will also be shared with emergency management agencies such as Civil Defence, the Ministry of Primary Industry and others working in the agricultural sector who need to be prepared for these events.

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## Ministry for Primary Industries

# The biosecurity system – a fine balance



*The detector dogs working at our airports and ports have a fantastic ability to sniff out trouble. Together with risk profiling carried out by their human colleagues, they help to intercept potential biosecurity problems and are often the face of our border controls.*

However, our biosecurity system is much more than the border inspectors and dogs checking incoming travellers and cargo. It is a complex system of checks and processes designed to minimise the risk of pests and diseases causing harm to our primary industries, while still allowing travel and trade to continue as freely as possible. It is a fine balance.

New potential threats arrive every day via the border by mail, trade and travellers. While free travel and trade is essential to our economy, we also need to provide assurances to New Zealand's trading partners about our continued freedom from specific organisms in order to keep trade lanes open for our exporters.

### Main partners

The Ministry for Primary Industries, formerly MAF, is the lead agency for biosecurity but we cannot do it alone. We work closely with partners on three fronts.

- Overseas to prevent harmful organisms from coming here at all
- At the border to identify and eliminate any that do arrive
- Within New Zealand to find and manage or eliminate pests established here.

The volume of trade and numbers of passengers entering New Zealand keeps going up. As we cannot physically be everywhere at once, we are constantly looking for ways in which we can work smarter, harness technology and develop innovative approaches.

Together with Customs, the MPI is implementing a new joint border management system which will lead to greater effectiveness and efficiency at the border. It will provide us with more information to segment travellers by biosecurity risk and allow us to focus our resources on the travellers and cargo which pose the greatest risk.

### Rural property database

We have set up a contact database of rural properties called farms online, which will hasten our response if a biosecurity alert is raised and help to limit any damage. In addition, the national animal identification and tracing (NAIT) scheme begins on 1 July this year for cattle, with deer joining the scheme in March next year. The NAIT system's database will store information about each animal's individual radio frequency tag number, animal location and contact details of the person in charge of the animal. The scheme will enhance New Zealand's ability to respond more quickly in the event of a biosecurity threat such as a disease outbreak.

The MPI is also working with primary industries to develop agreements on biosecurity for shared decision-making and cost sharing in biosecurity preparedness

and response. Once active, the Government Industry Agreement will provide an opportunity for industry groups to identify the biosecurity risks of greatest concern to them, and to jointly invest with the government to manage the risks with readiness and response activities.

## Help from the public

We depend on the public to do their bit to prevent unwanted pests and diseases coming into New Zealand and establishing or spreading. We encourage everyone to look to maintain good biosecurity practices, particularly those who have regular contact with plants and animals. We ask –

- Farmers to ensure they know the disease status of stock they buy in.
- Incoming travellers to declare and dispose of items as they enter New Zealand
- Boaties to check, clean and dry their boat and equipment between waterways, and keep moored boats clean and well anti-fouled
- Hikers in Northland forests to clean their boots and other equipment

We also run an exotic pests and diseases hotline 0800 80 99 66 that people can call if they suspect they have seen something. This is linked to teams of incursion investigators who are on call to follow up any potential reported risks.

## Trade offshore

A big project for us in recent years has been to move our efforts to mitigate the risks associated with trade offshore as much as possible, so that unwanted pests never even make it to New Zealand shores. We do this by working with people overseas who send products to New Zealand and moving to a verification model.

For example, MPI staff have worked with Japanese car exporters and importers, encouraging them to get used cars examined and decontaminated before presenting them for inspection. This results in cleaner vehicles, and therefore fewer rejections, reducing delay and cost.

We allow inspection and certification of used cars by accredited agencies as long as the cars meet the MPI import health standard. By August last year, three-quarters of Japanese used vehicles were going through this equivalence programme. This is a more efficient use of our resources, but maintains the same low level of risk.

## Four millions guardians

The MPI has begun the same approach with suppliers of livestock feed, as increasing volumes are coming in to meet demand from the farming sector. A particular challenge is to ensure that insects do not get into containers of feed while in transit.

Recently, two Australian feed manufacturers invited

MPI staff to visit and assess their production and distribution systems. As a result, those exporters are running trials of systems and processes which could reduce the risk of insect contamination. Protecting New Zealand's unique environment from the damage caused by pests and diseases is essential for maintaining our environment and economy.

While the beagles at the border are a key part of our border controls, they are just one small part of our biosecurity system. For it to succeed we need everyone to play their part – we are all New Zealand's four million guardians.

## The border in numbers

### Arrivals

- In 2010/11 just under five million passengers arrived in New Zealand by air and 40,000 arrived by sea. Every one of those passengers was assessed for biosecurity risk.
- That same year 668,000 sea containers arrived, 233,000 of them empty, along with 91,600 vehicles and machinery, and 35 million items of mail were processed at the border.

### Seizures

Of the air passengers arriving in the last year –

- 112,329 had risk goods seized from them which is 2.3 per cent, about the annual average
- Of those seizures, about 11 per cent involved undeclared goods.

The vast majority of seizures involve lower risk goods. Counting only high-medium risk goods, the compliance rate is between 99.3 and 99.7 per cent. These higher risk goods include fresh produce, contaminated used equipment and meat products.

### Infringement notices and letters

Infringement notices and warning letters are issued to passengers and crew who fail to declare biosecurity risk goods. Instant fines for border offences were increased in 2010 from \$200 to \$400 to send a signal that New Zealand takes biosecurity very seriously.

In 2010/11 –

- 4,600 infringement notices were issued to passengers and crew arriving in New Zealand
- 4,620 warning letters were issued.

### Specific risks

Most people do not pose a biosecurity risk. About 96 per cent of all passengers arriving at New Zealand airports do not carry risk goods that breach biosecurity requirements. The remaining four per cent carry risk goods, either declared or undeclared, which do not immediately comply with biosecurity requirements. These goods are either confiscated and destroyed or treated before being cleared.



**Peter Graham**

## Transmission line easements – a valuation conundrum



*New Zealand is currently in the process of a major infrastructure upgrade, the biggest investment in this country's infrastructure since the 1980s. There is considerable activity in the acquisition of easement rights for transmission lines by both transmission companies active in network extension and upgrades and generators providing new lines associated with their respective generation developments, mainly wind. There has been major publicity over Transpower's 400 KV line in the Waikato, but this is only one of a number of recent lines projects.*

There is a high degree of variation both in method and market value assessment in valuations being provided for these acquisitions. A variation of assessments and disagreement between valuers as the appropriate method for valuing particular land parcels is not uncommon. However, all valid market valuations must be able to be objectively related to market evidence. Although there may be significant differences between valuers from time-to-time, the valuation figures arrived at in current transmission line easement valuation assessments are consistently so far apart that the validity and credibility of valuation advice is, in my view, questionable.

As someone who works mainly for infrastructure providers, I perhaps question new methods that result in significant increases in valuation assessments more than others. Where those assessments are consistently at least double, and frequently up to four times the valuations provided using orthodox valuation methods, they justify careful examination. This article examines the considerations applicable, the differences in methods being applied by valuers, and the resulting wide variation in valuation assessments.

### **What has changed?**

The enactment of the Electricity Act 1991 paved the way for privatisation of supply of electricity. The previous wide powers under section 15 of the Electricity Act 1968 that gave power to 'survey construct, erect, lay down, maintain, renew or repair' lines were not extended into the 1991 Act, and statutory rights over private land were restricted to existing works.

No powers were given to build over private land without consent, but the government has deliberately preserved powers to apply to the Minister of Lands to have land compulsorily acquired under the Public Works Act. Network utility operators who have requiring authority status can apply to the Minister, using section 186 of the Resource Management Act, for the Minister to exercise powers of acquisition under the Public Works Act. Lines companies, and electricity generators constructing lines to distribute power from generation sites, are able to meet the network utility operator and requiring authority criteria.

### **Limited power**

The privatisation of supply on its own cannot justify a complete change of the parameters for valuing transmission line easements. Landowners may understandably

consider that they are dealing with commercial enterprises determined on maximising profits, and that they are entitled to a piece of the action. However their bargaining power is subject to limits.

Public works powers have a direct effect, if not on value, then on bargaining position. Acquisitions must be dealt with on a willing buyer and willing seller basis. When these powers are applied, no-one can extract a premium because they are unwilling to sell. Also no-one can exert price pressure because of unequal bargaining position. Privatisation has not changed this. In *Waugh and Robinson v AG* – High Court – the Court held that calculations of wrongful use damages for trespass are to be assessed as what the defendant would have been prepared to pay to purchase the right to do what they have done by trespass. This is held to apply a method which –

Realistically takes into account, as well, the land value of the properties affected, recognising that ultimately the defendant could have exercised powers of compulsory acquisition ...

The Courts have clearly and unequivocally recognised although that although a network utility operator is a private commercial entity motivated by profit, it makes no difference to the fact that transmission of electricity is an important public utility – *Daroux and Ors v AG and Counties Manukau Power Limited* – 1999 Environment Court Auckland.

The shift to privatisation does not in any way diminish the importance of electricity as a commodity necessary for many facets of modern day living across the whole spectrum of human endeavour from domestic to industrial. No doubt it is for this reason that Parliament prescribed the right for a Network Utility Operator to apply to the Minister of Lands to take land under Part II of the PWA. What is required is a proper and fair sense of balance between the two interests. Paragraph 57

## A proper and fair sense of balance

The principles of compensation under the Public Works Act are long-standing and well understood

- Property is to be valued in terms of its highest and best use. Special suitability for a purpose must be discounted where that purpose has no market other than the special needs relating to the public work.
- Compensation should be equivalent to loss being the objective monetary loss in value of the asset and costs incurred resulting from the acquisition and construction of the work on a ‘no better no worse’ basis.
- Entitlements should be assessed liberally to the extent that landowners are given the benefit of any reasonable, justifiable or genuine doubt.

The rationale behind these principles is clear and has been applied in public works legislation dating back to the industrial revolution. Private owners should not be disadvantaged, but neither should they be advantaged because of a demand created only by a public work. This is because that would provide a barrier and a disincentive to build and

operate the work and increase costs to consumers to the windfall benefit of landowners.

It is also important to note that irrespective of any perception to the contrary, assessment of compensation under the Public Works Act cannot be somehow different or less than market value. The words of Archer J in *Carlton Heights v Minister of Works* in the Land Valuation Tribunal Auckland in 1963 are as relevant now as they were then –

Witnesses giving evidence before this Court appear sometimes to be under the impression that there is room for substantial differences of opinion between a willing seller and a willing purchaser as to the value of a piece of land. It should not be overlooked that the statutory conception of a sale by a willing seller to a willing purchaser presupposes agreement between them upon a cash price which is acceptable and fair to both, and which represents the market value of the land.

The discounting of special suitability or potential use arising solely because of the particular needs of a particular purchaser, and for which there is no general market, could be argued as a limitation on market value. However a special one-off requirement for which someone will pay a premium, which is not reflected in the general market, is discounted in normal market valuations. Where a premium is paid for a property because it happens to meet the specific requirements of someone who wishes to build a supermarket or petrol station, valuers will discount that sale as an aberration. Special suitability for a power transmission line is no different.

## Above value

There is no doubt that in the current environment some power companies have been, and are prepared to pay, over and above orthodox valuation figures, irrespective of the fact that they are the only possible purchasers. If they did not have a requirement there would be no market for the easement. There is a strong argument that the extent to which they are prepared to pay for something that no-one else would pay for must also be discounted in assessing market value.

Valuers may possibly argue that these requirements are so widespread that they form part of a general market requirement and not a one-off requirement for which power companies are prepared to pay a windfall premium. However if they can justify this, they would need to establish why it is different from the supermarket or petrol station example.

If they can, they still must identify how to meaningfully compare evidence relating to acquisitions of rights where –

- The physical height, design and construction of pylons or poles, line spans, configuration and size, access and related infrastructure, line and pylon location and affect environment, views and building locations are all different
- The properties affected and the nature and extent of effects are different
- The extra amount the company is prepared to pay depends on profitability, affordability and viability of the line and associated projects which is different between companies and projects and may not be known by the valuer

- In order to unlock the potential which the power company has, it is necessary to spend a significant sum on the project and which is different in each case and may not be known by the valuer
- There are, or may be, time constraints or other unique factors such as militant landowner opposition which are completely different or simply unknown.

In a review of studies in the United States between 1975 and 1992, Kroll and Priestly in *The Effects of Overhead Transmission Lines on Property Values*, found that in about half the studies there was a loss in property values between two and 10 per cent and in the other half there was no appreciable effect. A study of the effects of transmission lines on residential properties in Newlands, Callanan and Hargreaves, in *The Effect of Transmission Lines on Property Values – A Statistical Analysis*, resulted in a conclusion that the effect of having a pylon has a negative effect of 20 per cent at 10 to 15 metres from the pylon, decreasing to five per cent at 50 metres and diminishing to a negligible effect at 100 metres.

They also concluded that the presence of transmission lines over or near properties was not a statistically significant factor. Although this is dated, and not directly valuation evidence as such, it does illustrate that the injurious effect element of lines is, in many cases, relatively moderate.

## Valuation approaches

### Before and after

The historical approach supported by public works legislation and case law has been to value easements based on the 'before and after approach'. This is valuing the property notionally with and without the easement and establishing value based on the difference. This approach appears to be supported by

the majority of registered valuers.

The benefit is that it has been used for a long time, there is a large body of case law relating to it and, at least in theory, it is able to be verified objectively by market comparisons. It is possible to compare prices achieved for properties subject to transmission line easements with prices achieved for similar properties which are not subject to easements.

It also allows for rational assessment of injurious effect, being the effect on value of the balance land over and above the value of the land interest taken valued in isolation. The approach to injurious effect taken by the High Court in *Braemar Station Limited v Minister of Works and Development* in the High Court, Timaru in 1984 is instructive. This is even though the case is old and relates to the taking of land which affected the land type, balance and productivity of the balance property rather than the taking of an easement.

The Court found that –

- The loss reflected by injurious effect must be reflected in an appropriate reduction in residual value
- Any other method of approach will lead to answers that involve double-counting or cash investment alternatives which would be inappropriate
- The after value was calculated taking into account the total permanent loss suffered due to the effect of the taking on the utility and profitability of the balance land
- Injurious effect was calculated by deducting the value of the area taken from the total loss in value
- A separate calculation of injurious effect based on a mathematical calculation of loss of production was rejected as double-counting.

Anecdotally, in discussing transmission line easements with valuers, it is evident that there have in some cases been practical difficulties in objective sales comparisons of



properties with and without transmission easements. This is because of the inability to actually identify any significant difference in values clearly attributable to the presence or non-presence of transmission lines.

### Corridors of effect

To consider the total permanent loss suffered due to the effect of the taking on the utility and profitability of the balance land where there is no clear market differentiation on a before and after basis, valuers have developed a 'corridors of effect' approach. This calculates the effect on land value as a reducing percentage of the value of the underlying land. The highest percentage reduction relates to the area under the pylons and lines, and a reducing percentage applies to the corridors further away, with adjustments made for proximity to buildings and other improvements.

Valuations for easements for energy pipelines in Taranaki reflects this. Only one corridor relates to the area occupied by the pipe, for the obvious reason that the effects do not extend outside the immediate area of the easement. The accepted method is to –

- Acquire a temporary lease during construction
- Pay an annual per hectare rate equivalent to gross earnings for the leased area calculated on a pro-rata basis as rental for the lease
- Assess the underlying land value to take into account all potentials for land use that is part of, and included in, the assessment
- Acquire a permanent easement for the pipeline and pay 50 per cent of the assessed value of the easement land traversed for the pipeline easement, adjusted to take into account the circumstances related to the land in question in terms of the valuer's professional judgement.

The payment is a total payment without any separate additional payment for injurious effect. It is deducted from the before value to arrive at an after value, which is then tested against the 100 per cent land value to provide a reality check. Although subjective, this is considered capable of being assessed in terms of a valuer's professional judgement and experience.

It is consistent with the principle expressed in *Carlton Heights*. A willing seller would not sell the land for nothing, and a figure representing the inherent value of the land on an area basis adjusted to take into account appropriate factors is acceptable and fair to both buyer and seller.

### Easement fee

Some registered valuers are using an easement fee based on a multiplier of land value. This is established by converting known compensation payments for transmission easements to a linear market rate at a per hectare rate. It is calculated on a stated corridor width for the easement through the property. The figure is then apportioned between land value and injurious effect and then expressed as a multiplier based on the current market value of the underlying land expressed on a per hectare rate.

This multiplier is typically in a range between 2.4 and

7.0 times the land value. It generally results in a valuation at least double that obtained using orthodox before and after methodology and often much more than that.

Valuations based on a simplistic multiplier without differentiation between applicable considerations and circumstances have the following difficulties –

- An easement necessarily involves a lesser right than full ownership on a purchaser. A formulaic valuation method, which results in a value over twice full freehold land value, is therefore always going to be questioned and needs to be thoroughly justified in order to meet professional standards.
- An easement valuation that exceeds 100 per cent of land value can only be valid if it includes an injurious effect element and this cannot be calculated on a mechanical formulaic basis.
- Injurious effect has to be justified in terms of the effect on particular properties. A linear rate derived from total payments cannot be apportioned between easement value and injurious effect without assessing the total effect of the line on individual properties.
- The justification given for calculation of an easement fee on a linear basis appears to be the same as that used for calculating injurious effect. To add one to the other must involve double-counting.
- Although a multiplier is stated as being a cross-check against the market evidence, the evidence relates to entirely different transactions which are not directly comparable in any conventional sense.
- Although the multiplier is intended to be a cross-check for both the easement fee value, plus the injurious effect element, the split between them as a proportion of the total has no separate validation mechanism. It is based entirely on subjective selection of percentages and corridors of effect.

Irrespective of Public Works Act considerations, the willing buyer and willing seller principle cannot be simply ignored. The Court of Appeal in *Hajnal v Asmussen*, confirmed willing buyer and willing seller as the applicable test in establishing compensation to the owner of affected land for the granting of an easement to provide access to landlocked land. The Court identified the following approach as appropriate –

- Identify the value of the land being taken
- Adjust the starting point with reference to other relevant factors such as the increase in value of the buyer's property, the expenditure in that the buyer will incur in establishing the easement, avoiding over-capitalisation and any detriment or inconvenience caused to either party.

This is the sort of approach any valuer is required to take to adjust and compare property sales for any particular class of property. If an urban valuer disregarded differences in condition, location, size and other relevant factors in evaluating market evidence of house sales, and did not disregard aberrations caused by particular unique circumstances or just obvious overpayment, they would be quickly taken to task. Valuations of transmission lines based on a multiplier without

serious analysis and differentiation of definable factors and differences should be treated no differently.

## Resolving the conundrum

The circumstances and rationale for differentiating the reasons why power companies have paid particular amounts for easements have not been publicly disclosed and are hard to establish. That is no reason for ignoring the fact that there are different reasons, and unless one power company wants easement rights over a particular property, there is no market for that easement to anyone including other power companies.

Anecdotally, one of the reasons advanced is that they have accepted valuations based on a multiplier derived from undifferentiated market evidence as evidence of market value. This would mean that the valuations themselves have contributed to the market that valuers are independently assessing.

If the acquisitions currently being used to support the easement fee approach can be justified as comparable open market transactions, this justification needs to be clearly established. That is something for the valuation community to address at a professional level, but I cannot see how such transactions can be credibly differentiated from aberrations caused by petrol station or supermarket purchases.

Just like those transactions, they are influenced by special circumstances and reflect what particular companies were prepared to do to get a deal in a certain timeframe in certain circumstances relating to their business. Whether it is articulated as such or not, they invariably include a premium over market value particular to that company and that requirement.

### Market evidence

If valuers can identify genuine market evidence and a competitive market which excludes atypical transactions and commercial premiums unique to particular transactions, they may be able to justify use of market evidence in valuing easement rights. However, they cannot simply rely on a market rate calculated on a linear or any other basis without analysing and differentiating the market prices in terms of relevant differentials in exactly the same way as they do in a normal market transaction. Without clear industry guidelines as to how a general market, rather than a one-off non-market, requirement can be identified and in-depth analysis of the costs and effects of different types of lines carried out, this is likely to remain unachievable.

Before and after methods, along with willing buyer

and willing seller principles are well accepted, understood and capable of independent assessment and review. Similar properties with and without power line easements can be compared, as can sales data relating to such properties. If this data discloses a measurable and consistent difference, it is a clear basis for a market assessment and for a check against any linear assessment. When there is no consistently measurable difference, then as the market discloses no appreciable market difference it is a factor to be weighed in the assessment of what a willing buyer and a willing seller would accept.

### Clear guidelines needed

The rationale supporting the corridors of effect approach is consistent with the ordered approach taken by the Courts in cases such as *Hajnal* discussed above. It is also consistent with the approach taken when very small areas are acquired from large properties where value is not reflected by before and after assessments. A logical starting point is lower than 100 per cent of land value for the affected area, on the basis that the right taken is less than 100 per cent of the bundle of rights attaching to that land.

The corridor of influence approach provides a mechanism for identification and assessment of relevant effects in accordance with the valuer's professional experience and expertise. The underlying before and after assessment still provides a reality check in terms of the reasonableness of the outcome. To quote *Carlton Heights* again –

When a valuer is called to give evidence, the Court prefers him to present a complete valuation of the land and to vouch for each step therein and the final conclusion arrived at.

This is equally appropriate to a formal report. Clear industry standards and guidelines would also be helpful.

It would be nice if power companies disclosed the commercial basis behind their commercial decisions with relation to their acquisitions and operations, but that is not something valuers can either demand or expect. The fact that companies make commercial decisions relating to unique site-specific needs is not new, wrong or unexpected. However, the fact that purchase figures cannot be broken down to component parts does not give a licence to either assume the existence of a genuine competitive market or to deal with these figures on an undifferentiated basis.

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## Success story

# CRS Software Ltd



### Budget - Main

Date Range: 1/06/2011 to 31/05/2011

#### Physical Data

Dairy Cows

#### Milk Production

#### Stocking Rate

118 Hectares

#### Revenue

- ▼ Dairy Cows
- ▼ Milk Revenue
- ▼ Total Dairy Cows revenue

#### Gross Farm Revenue

#### Expenditure

- ▼ Wages & Keep
- ▼ Animal Health
- ▼ Breeding Expenses
- ▼ Shed Expenses
- ▼ Electricity
- ▼ Feed & Grazing
- ▼ Fertiliser & Lime
- ▼ Regrassing
- ▼ Weed & Pest
- ▼ Farm - Other
- ▼ Vehicles
- ▼ Repairs & Maintenance
- ▼ Administration
- ▼ Rates & Insurance

#### Standard Farm Expenses

Farm Surplus (Deficit)

*CRS Software Ltd is a company known throughout New Zealand and Australia by farmers who use its farm management software to manage their finances. From its Masterton office in the heart of rural Wairarapa, the company with its staff of 25 employees, works on the development and marketing of the software programmes. It also provides support to clients via their support line and with regular training courses held throughout the country.*

The company was founded in 1981 under the name Computer Concepts by Ian and Isobel Campbell. As a farmer Ian believed there must be a better way to manage their finances and stock recording. Assisted by their farm advisor, David Baker, he set out to develop a programme designed specifically for farmers. The programme, originally called 'Concepts budget', was developed in 1983 and became an all-consuming activity for the Campbells who promoted it nationally to other farmers. They later changed its name to 'Cash manager'.

Although computer use in the farming sector was quite low, Cash manager had a good reception. Encouraged by early interest and sales the Campbells soon realised they needed to expand. In 1984 David Howden, a farm consultant, became a partner in the business and two years later they were joined by Brian Eccles, now the company's owner.

A former sheep and beef farmer Brian was well known in the local farming community. Born and raised on his family's farm at Bideford, he attended Massey University where he gained a diploma in agriculture.

Brian knew Ian Campbell well, having worked for him in his early days in farming. It was while working for Ian his own interest in computers began. At the

Class	Tally		\$ per Head	
	2012	2011	2012	2011
Beef				
R1yr Bulls	73	0	\$1,012.50	
R2yr Bulls	40	0	\$1,440.00	
R1yr Heifers	17	0	\$836.00	
Mixed Age Cows	14	0	\$552.89	
Dry Heifers	4	0	\$731.74	
Bulls	1	0	\$1,600.00	

time neither man could have seen how their friendship and shared interest in the computer's possible applications to farming would later result in a business partnership.

When Brian joined the company, what he lacked in computer skills he made up for with a sharp business mind and extensive farm experience. Learning on the job he soon realised the capabilities and possibilities of the technology he was using. When David Howden left the company, Brian took over the role of general manager.

## Awards

The 1990s was a significant time for the company. At the 1998 NZ Electronic and Software Awards the company won the Small Business Excellence Award and Software Product Excellence Award. It was also the time when the company saw an opportunity to move into the Australian market.

In 1995 the opportunity arose to purchase Lincoln Universities FRS Farm accounting software. The increased scale provided a strong foundation for growth and development of the software.

When Ian retired in 2004, Brian took over the company which under his ownership has continued to grow and expand. He admits in the early days he had no idea he would eventually own the company and there was no way of telling how successful it would be. He knew the programme had a lot of potential but it was hard to crystal ball gaze to see how far things would go. The internet had not even been thought of in the late 1980s.

Through the growth years of the 1980s and 1990s the company's philosophy was all about helping farmers to create and own their budgets, monitor cash flow and enhance their management by actively pursuing a forward looking financial view. Providing tools to enhance management is a principle the company has held dear through the years.

In the 1980s the banks were very keen on everybody doing cash flows and proper business management. During the 1990s that focus was lost in the capital gain boom, but now banks have returned to basic banking principles. They stayed steady on track and now the market forces have gone back to supporting the reasons why the company got started.



## Performance Summary (EFS)

for  
Sample Dairy

### Budget - Main

Date Range: 1/06/2011 to 31/05/2012

Enterprise: All Enterprise  
GST Exclusive

Physical Data	Opening SU	Closing SU	% Change	Breeding	%	Deaths & missing %
Dairy Cows	350	348	-0.57	Calving	90.00	4.14
	350	348	-0.57			
Milk Production	Total Milking Cows	Total KgMS	KgMS/Cow	KgMS/Ha		
	350	112,000	320	949		
Stocking Rate	Opening	Closing				
118 Hectares	3.0	2.9				
Revenue	total \$ per Milking Cow		per KgMS	per Ha	% GFR	
▼ Dairy Cows	47,911	136.89	0.43	406.03	6.85 %	
▼ Milk Revenue	651,919	1,862.63	5.82	5,524.74	93.15 %	
▼ Total Dairy Cows revenue	699,830	1,999.51	6.25	5,930.76	100.00 %	
<b>Gross Farm Revenue</b>	<b>\$ 699,830</b>	<b>1,999.51</b>	<b>6.25</b>	<b>5,930.76</b>	<b>100.00 %</b>	
Expenditure	total \$ per Milking Cow		per KgMS	per Ha	% GFR	
▼ Wages & Keep	(83,000)	237.14	0.74	703.39	11.86 %	
▼ Animal Health	(27,128)	77.51	0.24	229.90	3.88 %	
▼ Breeding Expenses	(9,063)	25.89	0.08	76.81	1.30 %	
▼ Shed Expenses	(1,497)	4.28	0.01	12.69	0.21 %	
▼ Electricity	(6,752)	19.29	0.06	57.22	0.96 %	
▼ Feed & Grazing	(75,783)	216.52	0.68	642.23	10.83 %	
▼ Fertiliser & Lime	(60,255)	172.16	0.54	510.64	8.61 %	
▼ Regrassing	(1,854)	5.30	0.02	15.71	0.26 %	
▼ Weed & Pest	(1,236)	3.53	0.01	10.47	0.18 %	
▼ Farm - Other	(1,926)	5.50	0.02	16.32	0.28 %	
▼ Vehicles	(9,785)	27.96	0.09	82.92	1.40 %	
▼ Repairs & Maintenance	(25,750)	73.57	0.23	218.22	3.68 %	
▼ Administration	(8,570)	24.49	0.08	72.63	1.22 %	
▼ Rates & Insurance	(16,405)	46.87	0.15	139.03	2.34 %	
<b>Standard Farm Expenses</b>	<b>(\$ 329,004)</b>	<b>940.01</b>	<b>2.94</b>	<b>2,788.17</b>	<b>47.01 %</b>	
<b>Farm Surplus (Deficit)</b>	<b>\$ 370,826</b>	<b>1,059.50</b>	<b>3.31</b>	<b>3,142.59</b>	<b>52.99 %</b>	

## Sample Sheep & Beef



SHEEP SALES ANALYSIS				
Class	Tally		\$ per Head	
	2012	2011	2012	2011
Sheep				
Sale Lambs	4346	0	\$65.11	
MA Ewes	600	70	\$70.50	\$78.26
Hoggets	297	297	\$75.33	\$50.87
Ewe Hoggets	67	0	\$92.00	
2th Ewes	30	0	\$76.00	

BEEF SALES ANALYSIS				
Class	Tally		\$ per Head	
	2012	2011	2012	2011
Beef				
R1yr Bulls	73	0	\$1,012.50	
R2yr Bulls	40	0	\$1,440.00	
R1yr Heifers	17	0	\$836.00	
Mixed Age Cows	14	0	\$552.89	
Dry Heifers	4	0	\$731.74	
Bulls	1	0	\$1,600.00	

Transactions

Cashflow

Invoicing

Warehouse

### Reasons for success

There are many reasons for the success CRS Software has enjoyed. One of these is having a former farmer at the helm, someone who understands exactly what they need to successfully manage their farm and encourage growth. The company also works from a grassroots position. It is still provincially based, and has never considered moving and becoming another big city business. By remaining in its rural setting it has maintained its true rural image.

Working closely with their customers, listening to their needs and keeping their technology simple for the end user has also been a pivotal factor in the company's success. In addition is the commitment to development of the software which has ensured Cashmanager Rural has grown into a brand highly respected by farmers, accountants, farm consultants and those in the agribusiness sector.

Considered an expert in farm budgeting software with a keen understanding of their market, CRS Software has built a strong relationship with its many customers and continues to work closely alongside them. Cash manager helps them succeed by providing a system which makes it easy to monitor progress to the plan and the ability to explore even more profitable options.

### Innovation

What has made Cashmanager Rural unique is that it is a programme designed by farmers for farmers, with everything needed to manage every aspect of their farm financials. In 2009 CRS Software introduced the online version. This was designed to meet the needs of those in equity partnerships, and quickly proved popular with the company's many clients who recognised the benefits of easy data sharing.

As data is stored in a central server it can be quickly accessed anywhere in New Zealand or the world, and gives the opportunity to allow others to use selected parts of the software wherever they are. This might include the farm accountant, consultant or bank manager. Users log in and the access rights control what can be seen and altered, enabling teamwork to be applied to planning and the implementation and review of farm management tasks.

It is the only online product which helps farm management teams create a cycle of improvement. A farmer

could be working at home while his consultant is working from his office, and both could be viewing changes as they are being made to the cash flow. The programme enhances budget ownership because the person spending the money is building and managing the budget.

Another benefit is its ability for transactions from selected suppliers to arrive pre-coded to standard farm management codes. The reduction in data entry effort leaves the farmer free to spend more time on planning. The strength of the Cashmanager system is the farming specific coding structure. It is this structure which sets it apart, producing specialised benefits traditional accounting software cannot. The programme is all about keeping people informed and bringing profit back into the forefront of their business.

### Good relationships

CRS Software has always been aware of the importance of developing and maintaining a close relationship with others in the financial sector. This has seen the company work closely with accountants throughout the country, many of whom use the online system as part of the management support services they provide to clients. This keeps the farmer informed of their progress and encourages innovative thinking that helps drive profitability.

A good relationship has also grown between the company and many of New Zealand's leading banks. Today many rural banking managers use the programme when working with their farming clients.

Today Brian is confident about the future of the company. As more farmers become connected to good quality rural broadband he anticipates that new ways of gathering, recording and analysing data will evolve – saving them time while increasing the benefits.

The opportunities are significant and online accounting has the potential to help farmers. Since the credit crunch, financiers want farmers to take ownership of their budgets. If farmers follow a good planning process they can improve profit and that is what CRS Software want to help them achieve.

The CRS Software mix of innovation and a sound understanding of what farmers need has turned Cashmanager Rural into part of the farming culture. It is a safe bet that under Brian's guidance it will continue to grow.

## NZPIM Council Member

# Profile of Richard Green



Richard Green comes from a non-farming family having been brought up in Sheffield, a small rural township 50 kilometres inland from Christchurch. His father ran his own electrical contracting business in the Malvern district, and was one of the only electricians in this area for most of his 40-year career. During this time Richard learned about the hard work involved in running a successful small business and the sacrifices business owners had to make to get ahead and grow their enterprises.

He also learned that his passion was for agriculture, and is grateful to his grandfather and farming aunts and uncles for allowing him to spend time working on their farms at weekends and during the holidays and many school evenings. From the age of 10, Richard was sure he would be a farmer, but was money-savvy enough to know this would take a lot of capital.

With this vision of land ownership in his head he took on two newspaper runs, four lawn-mowing jobs and then possum trapping for another income source. He also found weekend and holiday work doing general farm work, potato picking, clipping wires in roofs of houses for his father and digging trenches for laying cables.

### A career in farm management

School was not the highlight of Richard's life that it was meant to be, but instead a means to an end. It was clear to him at about 15 years of age that it would be best to learn about farming. It was also obvious that to get a career to maximise his income generating potential he would have to get a degree at Lincoln. He completed a B Ag Com in farm management, concluding at the end of 1988. During his time there he had decided that the desired job after Lincoln was being a farm consultant as it offered diversity in work, and if successful you would become an important member of the decision-making team of farming businesses.

After graduating, Richard was lucky to be one of 20 graduates who started with MAF as a trainee farm consultant and he was put through a six-month training programme. During this period he saw a wide range of various farming businesses and spent time with MAF consultants from one end of the country to the other. From these observations and experiences it really reinforced to him that the success of any business is the attitude, vision and motivation of the

business owner. This belief has moulded his own attitude and approach to business and life.

### Being a better consultant

Once he completed his training programme he was sent to MAF in Oamaru at the tail end of one of the worst droughts the region had faced. He was fortunate to work alongside and learn the job from other consultants in Oamaru such as Phil Tither and Clare Kearney, but also those working in Otago such as Ian Warren, Don Kennedy, Trish Burborough, Russell Stuck, John Bates and Colin Brown.

These were very challenging years for clients, with a lack of confidence across the whole industry following on from the removal of subsidies in the mid-1980s and some very difficult farming seasons climatic wise. It took a while for Richard to really understand what his role was. In the end he felt it was not about how would he add value by being a better farmer than his client, but instead to be a better consultant than his client. This meant providing a fresh set of eyes, being honest about how he saw things, asking the tough questions of the farming partnership, providing motivation and support, and most importantly making sure his advice helped the business owner achieve their objectives.

In Richard's view farm consultancy would have to be one of the most personally rewarding careers available, but he struggled to find ways to turn it into a business where he could use his time well, rather than be tied into a model of selling consultancy hours. He believes that present farm consultants still have similar challenges, and that a new model allowing teamwork using various specialists is one that needs to be implemented to ensure we provide an attractive career structure for graduates entering this profession. He feels it is just too tough, both emotionally and financially, to go out as a young consultant and start from scratch developing a full book of clients.

### Seed company work

The desire for using his time more wisely and a desire to learn more about agricultural value chains encouraged Richard to talk to his cousin John McKenzie also a farmer, farm consultant and founder of Agricom, a seed company based in Ashburton. After nine years of farm consulting, Richard joined Agricom as sales and marketing manager and was

fortunate to later become a shareholder.

The philosophy of Agricom was to benefit from the excellent research and development partnerships with AgResearch Grasslands and employ top farm systems staff who could integrate proprietary forages within farm systems. The business grew rapidly from just five staff in 1998 to over 20 when it was sold to PGG Wrightson in 2005. Richard worked for the next four years as a full-time employee of the company as the general manager of the international business.

### Current roles

The association with PGG Wrightson still continues in a part-time capacity as a business development manager and acting in a project manager's role when his expertise and skills are required. The rest of the week is filled up with a range of activities including a part-time role as CEO of Nuffield New Zealand.

Nuffield Farming Scholarships have been available to help develop emerging leaders in New Zealand for the past 60 years. In this newly-created role, Richard's job is to increase the number of scholarships awarded each year and help accelerate the development of these scholars into industry and community leaders at the end of the scholarship period.

He also manages and oversees a range of investments made by him and his wife Vicki, including four different rest home and retirement villages in the South Island, a shareholding in a dairy farm and investments in a couple of other start-up companies. The skills he feels he has learned through farm consultancy – people skills, strategic planning, developing partnerships and integration of technology within farm systems – have proved invaluable.

### Future role of the NZIPIM

On taking up a farm consultancy position back in 1989, one of the targets Richard set was to become a registered farm management consultant. That is, to be recognised by his peers and the industry as reaching the level and standard required to perform at a high level in this position.

Over the past 20 years he has gained a significant amount of value out of his membership of NZIPIM. Most of this has been from attending national conferences, regional Canterbury Westland Branch activities, and being involved as a participant and organiser of the International Farm Management Conference in Methven in 2011.

Richard believes that to maintain its relevance in the future the NZIPIM needs to evolve at both the national and regional level. It is essential that the organisation has a very strong regional structure throughout New Zealand providing networking opportunities and continuing professional development updates. He also feels that the NZIPIM needs to be identifying the right leaders at the regional level who can step up and make the institute relevant and rewarding to members at the local level. At the moment this seems to happen within some regions, but not nationwide.

### Raising the bar

At the national level he feels the NZIPIM needs to raise the bar in association with main industries around the professional standards which its members need to meet and be recognised for by farmers. This can be far wider than just registration for consultants, and can include accreditation for all the primary industry professionals that the Institute represents.

The trend in other industries and overseas is that rural professionals have to continually prove that they are qualified and accredited to carry out the various roles they perform for clients. Associated with this initial accreditation will be continuing professional development to maintain this registration. He feels the NZIPIM must lead this professional accreditation so that it is relevant and valuable for members, and not have it forced on the institute by regulators or other outside parties.

He says that this is an exciting time for agricultural and the NZIPIM will keep evolving to have quite a different form and function in the future than it has now. While not looking for another job he accepted the opportunity to be a Councillor as feels a need to keep giving back to the agricultural industry that has been so good for him over his career.



