

“COMING TOGETHER IS A BEGINNING.
KEEPING TOGETHER IS PROGRESS.
WORKING TOGETHER IS SUCCESS.”

Henry Ford



agresearch

Highlights 2010/2011

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**WE WILL NOT
BE LEFT BEHIND.
COME.**



The last 12 months have been characterised by immense change for AgResearch, partly self-imposed, partly the result of Government-led reform, and partly visited upon us by nature.

I am impressed by and deeply appreciative of the way the people in this organisation have risen to the challenges posed by these changes.

The CRI reforms have been well reported. Their impact on AgResearch and the sector is overwhelmingly positive, providing clarity of purpose and emphasising the need for AgResearch to move closer to the sector. This shift will inform our ongoing strategy and the science we undertake. Interested readers will find full details in the AgResearch Statement of Corporate Intent, available for download from the AgResearch website.

It should also be recorded that during the year FRST and MoRST merged to form a new entity, MSI. This consolidates ownership, funding and monitoring functions, creating further clarity for AgResearch in our dealings with the Crown. We appreciate all that the team at MSI provide to AgResearch and, indeed, to the whole pastoral sector.

CRI reforms notwithstanding, AgResearch faces an ongoing challenge to secure funds for the research that our sector needs. While it is widely known that New Zealand under-invests in R&D compared with other OECD nations (approximately 1.2% of GDP vs an OECD average of around 2.2-2.4%), less well known is that direct government investment in New Zealand is about on a par with other countries. The significant difference is in investment by the private sector, including industry-good bodies. Despite valid arguments concerning varying tax regimes, one fact remains: if the New Zealand private sector wishes to be globally competitive and relevant, it must invest realistically in R&D – and it is our responsibility to make that investment worthwhile.

Neither can the Crown afford to become complacent. While I applaud the Government's emphasis on science as one of the keys to this country's future wealth, I trust that the contribution of the pastoral sector – and the potential for the sector to contribute even more through innovation and scientific discovery – will not be overlooked.

The biological economy is the basis of New Zealand's competitive advantage, and R&D, along with human capital, is a critical driver.

This year's annual report is the first since the appointment of former Scion CEO Dr Tom Richardson as AgResearch CEO in late 2010. It is extremely pleasing to have someone of Tom's calibre in the role. He has hit the ground running, bringing fresh energy and an innovative approach to many areas in which AgResearch operates. His early period with AgResearch coincided with a thorough review of our strategy and our first Statement of Corporate Intent in response to the new, post-CRI Taskforce environment. This is covered in more depth in the Chief Executive's report.

During the year a number of long-serving senior executives and Directors left the company and it is my privilege to acknowledge the significant contribution they have made to this organisation over the years – a contribution that can never be fully measured. In particular, my thanks go to Dr Jimmy Suttie who assumed the demanding role of COO at various times over the last two years and was also acting CEO for a period. Directors Danny Chan and Andrew MacPherson who were very strong contributors to the Board, also left in 2011 and I thank them for their valuable input during their time with AgResearch.

This year has seen a pleasing turnaround in AgResearch's financial results, which were above budget. Nonetheless, the Board also recognises this result is not yet adequate, and is working assiduously with management to place the business on a more sustainable footing. This has been a demanding year for the Board and my thanks go to my fellow Directors for their work and dedication.

This report would not be complete without mention of the events in Christchurch over the last twelve months. While our AgResearch campus suffered relatively minor direct damage as a result of the September and February earthquakes, and we were thankful that no

AGRESEARCH'S PURPOSE IS TO ENHANCE THE VALUE, PRODUCTIVITY AND PROFITABILITY OF NEW ZEALAND'S PASTORAL, AGRI-FOOD AND AGRI-TECHNOLOGY SECTOR VALUE CHAINS TO CONTRIBUTE TO ECONOMIC GROWTH AND BENEFICIAL ENVIRONMENTAL AND SOCIAL OUTCOMES FOR NEW ZEALAND.

staff were injured or worse, some of our staff lost people close to them, or experienced damage to their homes and massive disruption to their lives. I acknowledge the resilience and tenacity that they have shown. Our thoughts continue to be with all our AgResearch staff in Christchurch and, indeed, with the whole city.

It is appropriate, too, to acknowledge all our staff, who have performed admirably during this time of change. As an organisation, we are only as good as the science we conduct, and the degree to which that science connects with stakeholders. Thank you all for the wonderful contribution you make.

Sam Robinson
Chair

Acronyms

CRI – Crown Research Institute
FRST – Foundation for Research, Science and Technology
MoRST – Ministry of Research, Science and Technology
MSI – Ministry of Science and Innovation



This year, the eve of the 20th anniversary of CRIs, was a pivotal year for AgResearch. The government's adoption of the highly regarded CRI Taskforce recommendations created the opportunity for CRIs, their owners (government) and the sectors we support to re-examine how we all work together to deliver the greatest possible returns to New Zealand from the investments made in us.

At AgResearch, we grabbed that opportunity. Through over 100 meetings and workshops with our sector, and even more within our organisation, we re-examined the environment within which we all operate and the existing or emerging strategies of many of our end users. Against this backdrop we created an aspirational value proposition that AgResearch would work towards, to deliver our best for New Zealand. We then tested various business and operational models and organisational design options that would align with and put the wheels under a new strategic plan.

The culmination of all this work was that, at year's end, we had a clear strategy (expressed in our Statement of Corporate Intent, available from the AgResearch website) that linked our scientific thought leadership with the short, medium and longer term needs of our sector, and a radically different, partnership-based structure that we feel is the route to deliver on our value proposition as One AgResearch: To partner with the pastoral sector to identify the innovation that is needed and deliver our collective expertise to create value for New Zealand. And we had a new organisational structure that aligned with our new strategy.

All this work, coming together as it did, was a highlight for the organisation this year and for me personally. I would like to acknowledge and thank those who have made it possible. Many sector leaders gave their time generously and shared their thinking, which enabled us to re-shape ours. Our 2010/11 Executive Management Committee and wider staff honestly re-examined how we work with our sector and how we work with each other at AgResearch, and then described a "to be" scenario of how we want to work. And finally our Board. It's one thing to espouse brave, new thinking and the need for fundamental changes, but it is another to have the moxie to stay true to that mantra when hard and risky decisions need to be made along the way. AgResearch Board members have been unwavering in their commitment to re-position the company.

The journey to deliver on this potential is really just beginning and our staff and sector partners are committed to that journey.

The dark note in our year came with the Canterbury earthquakes – a stark reminder that some events cannot be planned for. Our staff, like so many people in the region, continue to be affected by the ongoing impact of the quakes and they can count on AgResearch's continued support as they get their lives back in order.

Of course, we had to grapple with all these challenges while we simultaneously delivered on the commitments we had to those who rely on our work. The great joy of leading an organisation like AgResearch is the daily examples of how our talented staff make a difference. In that regard, our staff had an exceptional year. This document highlights a very small number of our accomplishments, ranging from individual recognition for scientific excellence right through to the culmination of many years' work by large teams contributing to outcomes of national importance. The perceptive reader will note a recurring theme through this document – the power of collaboration and partnership in delivering value to the sector.

Financially, it has been a good year too. AgResearch produced a net profit after tax of \$6.2 million, a significant improvement on last year's result. This represented a return on equity of 3.3%, a figure that rises to 9.1% when adjusted for restructuring costs and asset revaluations. This result is a reflection not only of actions taken this year, but also bold decisions made by my predecessor, Dr Andy West, and his team.

All of this means that AgResearch is well-positioned to make an ever greater contribution to New Zealand, as we have described in our new strategy. And we must.

Agriculture contributes 45% of New Zealand's merchandise exports, accounting for \$20.9 billion of merchandise exports in the year to

June 2011. This is not simply the result of abundant natural resources – in fact, New Zealand is a small country with finite resources. It is a function of work done by hundreds of people over many decades in AgResearch and other organisations dedicated to growing our wealth through the agricultural sector.

Here's a fact some find startling. Since the late 1970s, productivity in the farming sector has increased at twice the rate of all New Zealand's sectors combined. That's what good science linked through to those that deploy it can do for you. And there is much more to gain from the science that we and our partners are now undertaking.

In closing, as well as the successes described in the stories that follow, I would like to mention some other highlights from the past year that we haven't the space to cover more fully. In no particular order:

- Our sheep genomics researchers led by John McEwan were part of the International Sheep Genomics Consortium that publicly released the first two versions of the sheep genome, thanks to investment by Ovita, Pfizer and Beef + Lamb New Zealand.
- A new dyeing process that allows vibrant colouring of wool fabrics, developed by our Textile Science and Technology team and launched at New Zealand Fashion Week, is now being commercialised by BGI Developments Limited under the brand name Lanaquin.
- PestWebNZ was released at the 2011 Fieldays. This website enables key pasture weeds and pests to be identified and provides information on their biology, impact, management and control, thanks to work by a team comprising AgResearch, farmers, Beef + Lamb New Zealand, DairyNZ, AbacusBio, regional councils, farmer consultants, Otago Polytechnic, New Zealand Plant Protection Society and other commercial companies, with investment by the MAF Sustainable Farming Fund.

- Grasslands Relish, a red clover variety that provides a 60% increase in plant survival after four years grazing compared to the best other variety in the market, entered the seed multiplication phase and will be available on farm in two to three years, thanks to work by the Forage Breeding Innovation team and investment by Grasslands Innovation Limited.
- Our site services team, in collaboration with the scientists involved, successfully relocated our Food Microbiology & Safety research team to the Hopkirk Institute in Palmerston North, where the work the research team has done for many years to support the New Zealand meat industry's excellent food safety performance is now strengthened by links to animal health, rumen microbiology and food science researchers at our Grasslands campus and Massey University.

These outstanding results, and many others like them, are continuing to unfold as you read this and are why we are so positive about the contribution AgResearch will make to our sector in the years to come. My thanks go to our staff and stakeholders who have made 2010/11 such a successful year for AgResearch and I look forward to even more progress in 2011/12.

A handwritten signature in black ink, appearing to read 'Tom Richardson'. The signature is fluid and cursive, written over a white background.

Dr Tom Richardson
Chief Executive

A photograph of two men in a laboratory or office setting. The man on the left is older, with grey hair, wearing a dark jacket and holding a pair of glasses. The man on the right is younger, smiling, and looking at a device held by the older man. The background is a dark, reflective surface.

**“WHEN WE
SEEK TO
DISCOVER
THE BEST IN
OTHERS, WE
SOMEHOW
BRING OUT
THE BEST IN
OURSELVES.”**

William Arthur Ward

Great achievements are never the result of individual effort alone. Either they are built on the work of others who have gone before, or they come from a concerted, coordinated team effort – or both. One of the inspiring features of the stories that follow is the willingness of the people and organisations at their centre to learn from and collaborate with others in the name of promoting New Zealand’s economic, cultural and environmental wellbeing. Also striking is that they are just a sample of the many achievements being made by teams led by or including AgResearch scientists.

Leading by example

How do you balance the twin pressures of feeding a rapidly expanding population while also meeting society's high expectations around the environment?

While that's a global question, many of the solutions are likely to be found at a local level. Take New Zealand. Just under a half of our greenhouse gas emissions come from agriculture, but internationally agriculture produces only 14% of all such emissions. As global food demand increases, agricultural emissions are expected to rise by about 30-60% above 2005 levels by 2050 if nothing else changes.

One way to help bring about more rapid change is to coordinate and accelerate the wealth of research already under way in this area. That's what happened in March 2010 with the official opening of the MAF-funded New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC). A collaboration between AgResearch, DairyNZ, Landcare Research, Lincoln University, Massey University, NIWA, the Pastoral Greenhouse Gas Research Consortium (PGGRc), Plant & Food Research and Scion, the NZAGRC announced in January the first 18 long term science programmes for which it will provide a total \$15.5m of funding over four years.

The programmes – some of them new, some extending and aligning with existing research primarily funded by the PGGRc and MAF – include work to reduce methane and nitrous oxide emissions, increase soil carbon accumulation and to design farm systems that utilise new research and technologies on farm to reduce greenhouse gas emissions with no loss of profitability.

Dr Harry Clark, NZAGRC Director, is unequivocal about the value of the centre.

"Agricultural greenhouse gas emissions are a distinct challenge for New Zealand," he says. "Appropriately, we have developed comprehensive research programmes and are at the forefront of global efforts to tackle agricultural emissions. The NZAGRC helps coordinate these efforts on behalf of New Zealand and plays a central role in developing the national science strategy on mitigating greenhouse gas emissions."

The scope of NZAGRC is not limited to domestic borders though; it also contributes to international research efforts to reduce agricultural greenhouse gas emissions via its input to the Global Research Alliance. The Global Research Alliance is a New Zealand-inspired global initiative whose 32 members (and growing) are working collectively to seek new ways to grow more food without increasing greenhouse gas emissions.

New Zealand has a lot at stake here. As Minister of Agriculture David Carter stated in February, "consumers the world over expect food to be produced to the highest standards of quality and safety [and expect] producers to take into account the environmental impact of farming systems."

There's no doubt that New Zealanders want to do the right thing – we've often led the world in social change. But that's not the whole story. By leading the way in reducing agricultural greenhouse gas emissions, we are also protecting our reputation in the global food market. Given the importance of food exports to our collective wealth, that's a reputation worth taking care of.

The four target areas.

The NZAGRC long term research programme is directed to four key areas. Eight Principal Investigators from across the member organisations coordinate the science teams undertaking each project, and the delivery of their research outputs. An annual review of the research ensures it remains relevant to both domestic and international stakeholders.

1. The Methane Programme: Up to 97% of agricultural methane emissions in New Zealand come from cattle, sheep and deer as they digest feed. The Methane Programme includes projects to find inhibitors that suppress the organisms responsible for producing methane; breeding animals that produce less methane; testing new, low-methane-producing animal feeds; and investigating the economic viability of collecting methane produced from animal wastes.

2. The Nitrous Oxide (N₂O) Programme: In global warming terms, nitrous oxide is over 300 times more potent than carbon dioxide. In New Zealand, about 14% of all greenhouse gas emissions are in the form of N₂O from agriculture. The N₂O programme includes projects to reduce nitrous oxide emissions from urine patches across a wide range of soil and climate conditions; and growing high-yield pasture with lower nitrogen content.

3. Soil Carbon: Thanks to significant investments into science over many years, we now have a good understanding of the benefits of having high levels of soil carbon. We have also made significant progress in quantifying how much carbon is stored in agricultural soils. Current NZAGRC-funded work is about understanding the management practices that can keep and increase the amount stored.

4. Integrated Farm Systems: This research programme is dedicated to "joining the dots" – linking science from a range of sources to ensure that practical, cost effective, low greenhouse gas-emitting farm systems are developed and can be applied by farmers.

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Hon. DAVID CARTER
MINISTER OF AGRICULTURE



Sustainably competitive

Four years beyond inception, a programme designed to boost farm productivity and lessen environmental impacts has proved successful and the organisations behind it are now planning to invest in a further five years.

Pastoral 21 is a collaborative venture among DairyNZ, Fonterra, Dairy Companies Association of New Zealand, Beef + Lamb New Zealand and the Ministry of Science & Innovation. A joint investment of \$34m since 2007 has seen teams from many research organisations work together in a variety of coordinated research and farmer adoption programmes.

Initial programmes encompassed the full spectrum of scale and complexity. One study showed the production impact of grazing management and diet composition, while another involved systems thinking (how individual elements influence one another within a complete entity) among multiple stakeholders to set targets and agree on a preferred approach to improve the quality of waterways.

Pastoral 21-II is, if anything, bolder than its predecessor. Its twin goals are:

- a \$110/ha/year increase in average profitability from dairy production, with a 30% reduction in nitrogen and phosphorous losses to water.
- a 3% annual meat productivity increase, while containing or reducing environmental footprint.

Delivering on these goals will mean changing the current relationship between production and environmental footprint, says AgResearch's P21 co-leader Brent Barrett.

"Thanks to science, better farm management practices and other tools, we have found amazing ways to increase farm production over the years," he says. "We've also found ways to reduce environmental footprint – but not at the same pace."

"Our goal is to reverse that trend – to ensure efficiency gains to reduce our environmental footprint are larger than production gains."

So who wins in this scenario – farmers or the environment? "Both," says Brent. "Production gains are as critical as ever. What's changed is that the commitment to creating gains that are sustainable, within a quantum of environmental footprint, has gone up a whole new level."

Pastoral 21-II objectives sit within three broad themes: Next generation dairy systems, lifting profitability for mixed livestock systems, and breakthrough technologies.

The dairy work is a five year farm systems programme in four key dairy regions that aims to implement new dairy systems integrating proven component concepts to increase profitability from production while reducing the environmental footprint.

The mixed livestock programme also has redesigned systems at its core – but this time with the aim of optimising and utilising forage growth on farms where lambs and young beef animals are finished on hill country.

Breakthrough technologies are not about any particular farming sector, but about proving new concepts that offer the potential to change the relationship, described earlier, between production gains and environmental footprint.

Co-led by Cecile de Klein (Invermay) and Brent Barrett (Grasslands), Pastoral 21-II will draw on the work of its predecessor, as well from other public- and industry-good R&D programmes, to create proven solutions that can be practically applied on farms.

Investors

P21-II investors include DairyNZ, Fonterra, Beef + Lamb New Zealand, Dairy Companies Association of New Zealand and the Ministry of Science & Innovation.

Research Collaborators

The collaborating research organisations include AgResearch, DairyNZ, Massey University, Lincoln University/Telford Rural Polytechnic, NIWA, Plant & Food Research, Landcare Research and On-farm Research.

"P21 shows how organisations working together at both the investment and the delivery end of science and innovation create teams that can have a real impact. This ensures options are available for New Zealand pastoral production to remain sustainably competitive," says DairyNZ CE, Dr Tim Mackle.

“ P21 SHOWS HOW ORGANISATIONS WORKING TOGETHER AT BOTH THE INVESTMENT AND THE DELIVERY END OF SCIENCE AND INNOVATION CREATE TEAMS THAT CAN HAVE A REAL IMPACT.”

Dr TIM MACKLE
CE – DairyNZ



The sheep, the scientist & the entrepreneur

How nature, AgResearch and two determined business people created one of the world's most exciting new fabrics.

Where do you think the world's most innovative fabrics come from? Milan? Manchester? Paris? How about Otago?

Gimono is an innovative, Dunedin-based company founded by judo black belt (and instructor) Grant Scott and business partner Lavinia Calvert. Five years ago, sick of sweltering inside hot, heavy cotton uniforms, Grant decided enough was enough. He and Lavinia spent months searching the world for a better alternative. There was none. So, armed with a design brief, they approached AgResearch.

"We want to develop a performance textile that outperforms cotton in every respect," they said. The list of requirements was long and, in Lavinia's words, "unreasonable". It had to be lighter when wet, stronger, cooler, more comfortable and less smelly after a vigorous workout.

"The AgResearch team not only listened to everything we said," says Lavinia, "they also got excited. The combination of us knowing what we wanted, and AgResearch's readiness to look beyond what they already knew, produced the result."

It wasn't easy. "We suggested a knit structure of wool plus a reinforcing material," says Dr Surinder Tandon, who spearheaded the AgResearch Textile Science and Technology effort. "Wool for comfort, synthetic for strength."

Sounds straightforward, but finding the right wool, the right synthetic, and the right way to combine them out of the infinite possible variations took what Lavinia calls "stickability" – that is, a willingness to methodically work through the various options.

Science isn't always about flashes of insight, but about the hard work of eliminating what doesn't work.

The product that emerged, Fortitude™, is a world first fabric technology combining merino and synthetic yarns to provide an antimicrobial, odour-resistant, machine washable, quick drying and super strong alternative to cotton. Now being used by Gimono in its revolutionary range of performance fight wear, Fortitude™ is living up to its name.

You don't have to be a judo exponent to see the possibilities. Grant and Lavinia are now exploring ways of commercialising Fortitude in a variety of other uses, including fashion, corporate wear (think flight attendants and others who need robust yet stylish clothing), active wear and light industry. Their company was recently ranked #2 in the National Business Review's (NBR) Exciting Companies Index for the Sporting Goods manufacturing sector in New Zealand and is poised for great things.

All from a partnership that refused to accept that unreasonable equals impossible.

Whether such a partnership could happen anywhere else is an interesting question. Lavinia's view is clear: "We're very fortunate in New Zealand in being able to tap into world class expertise," she says. "It's never easy to do what we did, but it's easier here than in many countries. We got everything we expected from AgResearch, and more."

Merino the Miraculous

Science is full of paradoxes. For example, merino wool is two to five times finer than human hair, which gives it an exceptionally soft feel. Yet it's also phenomenally strong and can be flexed up to 30,000 times before breaking (that's a lot of judo throws, tomodachi).

It's also hygroscopic, which means it can absorb a lot of moisture vapour yet its surface repels liquid. So if you're active, it'll suck up the sweat that evaporates off your skin, leaving you cool and dry. It also adapts to variations in temperature, keeping you warm in the cold and cool in the heat or after a heavy workout.

Finally, merino's unique physical and chemical structure makes it resistant to bad smells and soiling.

That made merino a natural choice for Gimono. But finding the right material to blend with the merino, and getting the structure and proportions of each material right, was another matter. A sheep is just a sheep, even if it is a merino. But add good science and entrepreneurial flair, and you have a fabric that is not only turning the martial arts world on its head, but also set to turn heads throughout the fashion and apparel worlds.

"IT WAS A WORLD-CLASS EXPERIENCE WORKING WITH AGRESEARCH DEVELOPING THE REVOLUTIONARY MARTIAL ARTS MATERIAL IN THIS GARMENT."

LAVINIA CALVERT
CO-FOUNDER, GIMONO



Keeping the lake clean

Rerewhakaaitu, the southernmost of the 12 Rotorua Lakes, hugs the slopes of the sleeping Mt Tarawera. Formed just 700 years ago, its catchment was the last area around Rotorua to be developed for farming.

In the early 2000s, nutrient levels in the streams flowing into the lake were found to be rising. Concerned, local farmers launched Project Rerewhakaaitu. The aim: to preserve the lake for future generations.

Grants were secured from the MAF Sustainable Farming Fund, Fert Research, DairyNZ and the Bay of Plenty Regional Council. AgResearch and NIWA were appointed to carry out scientific work and Bob Parker of Fruition Horticulture was appointed to oversee and coordinate the whole project.

The first few years were a data gathering exercise. How much nitrogen and phosphorous were being applied to farms around the lake? How much was entering waterways?

Ian Power and Bob Longhurst of the AgResearch team say that measuring what happens on a number of farms around a body of water makes it possible to create models that predict the amount of nitrogen and phosphorous lost from any given farm and, potentially, entering the lake.

Overseer®, developed by AgResearch with funding from MAF and Fert Research, is such a modeling tool. Designed to help farmers create efficient and effective nutrient management programmes, it can also be used to “investigate mitigation options” to improve nutrient management, says Ian.

By 2009, almost every farmer within the catchment was using Overseer® and acting on AgResearch’s recommendations for reducing nutrient loss.

That same year, something unique happened.

Bay of Plenty Regional Council invited the farmers to create a catchment plan for Lake Rerewhakaaitu. The farmers took up the challenge, which became Phase 3 of the project, with support from the council, the MAF Sustainable Farming Fund and DairyNZ.

“This is about farmers coming up with their own solutions, based on knowledge gained during the project and from organisations like AgResearch,” says Ian.

Building trust with the farmers is a key component of this project – without it Phase 3 would never have gotten off the ground. “A lot of credit has to go to the Bay of Plenty Regional Council, Bob Parker and AgResearch,” says Ian. “They’ve all worked hard to build trust with the farmers. It has taken time but is absolutely critical. The project is now receiving a lot of attention from regional councils throughout the country.”

Bob Parker agrees. “The farmers are onto it,” he says, “and the council is committed to results being delivered from the ground up, rather than imposed from the top down.”

“This project also shows that it’s possible to farm intensively around waterways without contaminating them. Project Rerewhakaaitu is a great model for other farming communities to follow.”

Bay of Plenty Regional Council Chief Executive Mary-Anne Macleod praised farmers and AgResearch’s initiative to work collaboratively on helping protect waterways and lake water quality.

“Lakes are important assets in our region,” she said. More about the Rerewhakaaitu farmer’s experience is on the Regional Council’s website, www.boprc.govt.nz, keyword “Rerewhakaaitu”.

“THIS PROJECT SHOWS THAT IT’S POSSIBLE TO FARM INTENSIVELY AROUND WATERWAYS WITHOUT CONTAMINATING THEM.”

BOB PARKER
FRUITION HORTICULTURE



Breeding a better sheep

Between 1997 and 2009, thanks to greater lamb weights and more lambs per ewe being born, the weight of New Zealand lamb produced per ewe rose by a spectacular 81%.

This gain was the result of an ongoing, concerted effort by many organisations including Ovita, a joint enterprise between AgResearch and Beef + Lamb New Zealand (formerly Meat & Wool NZ).

Even more spectacular is that the rate of genetic gain among the national flock may become faster still. One reason: a new technology called the Ovine SNP50 Beadchip.

Developed by researchers from AgResearch, Baylor UCSC, Australia's CSIRO, Utah State University, the USDA, and biotech company Illumina, the SNP50 allows researchers to identify the small genetic differences that produce important traits in sheep including not only growth rate, but also fertility, parasite resistance, survival and more.

SNP chips do what traditional DNA methodology can't: namely, test the genetic merit of an animal, opening up the potential to select on many genes across the whole genome.

That said, the first iteration of the ovine SNP chip (based on Ovita technology and released commercially by Pfizer Animal Genetics in 2010), was able to measure for just six traits across three sheep breeds. Later versions are more powerful still – having recently added meat yield traits, wool and facial eczema – and the future promises even more quantum leaps in 'processing power'.

John McEwan heads the AgResearch team behind the new chip. Recipient of the 2010 Ross Clark Distinguished Biotechnologist of the Year Award, John says recent developments include a test that can identify potential sire rams at birth, and they are working on measures for longevity, adult live weight and lamb survival.

"You can currently record these," he says, "but you can't get accurate breeding values for an animal until many years after it has first bred." In other words, the technology is causing a shift from a broad-stroke historical model (pick the animals that have performed well and breed from them) to a powerful, fine-tuned, predictive one.

The prospects are huge. The SNP chip is combining with other work, including the long-running Beef + Lamb New Zealand funded Central Progeny Test, to the extent that John believes a doubling of the current rate of genetic gain is now on the cards.

That creates a new challenge. "The changes we scientists create are always disruptive. Sheep breeders range from instant adopters to those who feel very uncomfortable about using new methods. So one of our challenges is to take what we've learned and package it in a way that's consistent with the methods breeders already use and that their commercial farmer clients also understand."

"The Red Meat Industry sector strategy identifies improving productivity at all stages of the supply/value chain, leveraging R&D and knowledge transfer as critical elements of sustainable future profitability. Beef + Lamb New Zealand's collaboration with AgResearch through our joint enterprise, Ovita, continues to play a central role in delivering on these goals."

Dr Scott Champion, CEO, Beef + Lamb New Zealand

“THE RED MEAT INDUSTRY SECTOR STRATEGY IDENTIFIES IMPROVING PRODUCTIVITY AT ALL STAGES OF THE SUPPLY/VALUE CHAIN, LEVERAGING R&D AND KNOWLEDGE TRANSFER AS CRITICAL ELEMENTS OF SUSTAINABLE FUTURE PROFITABILITY.”

Dr SCOTT CHAMPION
CEO, Beef + Lamb New Zealand



Award-winning commercialisation

There's hardly a pastoral farmer in New Zealand who hasn't, by now, heard of the AR1 and AR37 endophytes that have been inoculated into ryegrass. The products of years of research by AgResearch scientists, these endophytes protect the grass host from insect attack while minimising animal health and welfare issues.

What's less well known is the role that an AgResearch company, Grasslanz Technology Limited, plays in ensuring that such breakthroughs reach the market and create wealth for not only the end user, but also for the rest of New Zealand. Established in 2003, Grasslanz develops ideas with potential market value (and potential to benefit the agricultural sector) for commercial partners such as seed companies. Once a commercial partner is engaged, an R&D and licence agreement is developed. As part of the R&D programme the intellectual property of the concept is protected – using patents, trademarks, plant variety rights and trade secrets. Following the R&D programme the commercial partner takes the idea to full production and, from there, to the market. Grasslanz earns a royalty or technology fee from the sales of the product or technology by the commercial partner.

If this sounds straightforward, think again. In fact, commercialisation – to give it its usual name – is a demanding practice that takes courage, lateral thinking and the ability to forge long-lasting relationships based on deep trust.

Grasslanz is one of New Zealand's success stories in this area. The company has dozens of patents, trademarks and plant variety rights applications or grants in different countries around the world and earns royalties in New Zealand, Australia, the USA, Europe and South America.

In 2010, its work was recognised with the Best Commercialisation of Intellectual Property prize at the prestigious New Zealand Trade & Enterprise International Business Awards.

Then, in May this year, Grasslanz was named a category winner of the 2010/2011 DuPont Australia and New Zealand Innovation Awards – the only New Zealand company to receive such an accolade.

The winning innovation comprised two grass endophytes (since branded AVANEX™) that repel birds without harming them. The endophytes are also unpleasant to many grass-feeding insects, reducing their populations amongst the grass that is infected with it. That, in turn, gives birds yet another reason to feed elsewhere.

Already, a number of New Zealand airports have taken advantage of this grass, which significantly reduces bird numbers. Now the commercialisation effort is going global – not just in airports, but also in orchards, golf courses and other environments where birds are unwelcome.

John Caradus, Grasslanz CEO, says recent research suggests grass endophytes may also be useful in other crops such as cereals. If so, the potential market is vast. Other promising avenues not associated with endophytes include forage grasses that may improve animal health and prevent bloat.

As with other stories in this document, this one is a tale of collaboration and partnership. The bird deterrent grass technology arose from science done by an AgResearch scientist, Chris Pennell, development funding from Grasslanz, the Foundation for Arable Research, and Christchurch International Airport Limited (who also invested in initial trials), and product and market development from Grasslanz and commercial partner PGG Wrightson Seeds.

“PGG Wrightson Seeds have been working with Grasslanz in the commercialising of new technologies since 2005; however, as individual companies prior to the merger of Agricom, PGG and Wrightson, the seed businesses had been working with Grasslanz and AgResearch for over 20 years.

The success of this long term relationship is based on having trust in your partner, which in this instance has been developed over the many years of involvement. It is also about the seamless way in which together we can take ideas through to a commercial reality. Both Grasslanz and PGG Wrightson Seeds work collectively to identify potential opportunities and how to capture these. The relationship is one where any issues are discussed openly and freely with the clear aim of resolving the issue and delivering a successful outcome to the New Zealand farmer.

From specific pasture cultivars to the new novel endophytes for pasture grasses, and now the AVANEX™ endophyte range, the Grasslanz relationship with PGG Wrightson Seeds is a critical one for our business.”

John McKenzie, Group General Manager – AgriTech, PGG Wrightson Limited

“THE GRSSLANZ TECHNOLOGY RELATIONSHIP WITH PGG WRIGHTSON SEEDS IS A CRITICAL ONE FOR OUR BUSINESS.”

JOHN MCKENZIE

GROUP GENERAL MANAGER – AGRITECH, PGG WRIGHTSON LIMITED



“THANK YOU TO ALL OUR STAFF FOR THE WONDERFUL CONTRIBUTION YOU MAKE”

SAM ROBINSON

CHAIR

Dr Nicole Roy was appointed an Adjunct Senior Lecturer and **Drs Jolon Dyer, Paul Shorten** and **Adrian Cookson** were appointed as Associate Investigators in the Riddet Institute.

Dr Maureen O’Callaghan was appointed an Adjunct Associate Professor at Lincoln University.

Dr Stewart Ledgard was appointed an adjunct Professor in the New Zealand Life Cycle Management Centre at Massey University.

John McEwan was appointed an Honorary Fellow in the Department of Anatomy and Structural Biology, University of Otago.

Drs Mark Hurst and **Steve Wakelin** were appointed Honorary Researchers at the Bio-Protection Research Centre, Lincoln University.

Dr Stephen Goldson was appointed Vice-President of the Royal Society of New Zealand (Biological and Life Sciences) and Chair of the Academy of the Royal Society of New Zealand.

Dr Trevor James was elected President of the Councils of Australasian Weed Societies.

Mrs Jayanthi Swaminathan was elected as an Executive Committee Member of the New Zealand Plant Protection Society.

Dr David Heath was appointed a World Federation of Parasitologists ‘Distinguished Parasitologist’.

Dr Mustafa Farouk was appointed to the NZFSA Halal Standards Advisory Council.

Dr Bruce Veit was appointed to the “Faculty of 1000” in recognition of his expertise in the field of plant growth and development. The faculty hosts a website for scientists providing rankings and commentary on current scientific research papers.

Dr Rex Munday was appointed to the European Food Safety Authority’s Panel of Experts.

Dr Jenny Juengel was appointed to the Editorial Board of the journal Domestic Animal Endocrinology.

Dr Anisur Rahman was re-appointed for a two-year term as an International Advisory Board Member to PERTANIKA Journal of Tropical Agricultural Science. He was also appointed as an International Advisor of the Journal of Agrobiotechnology, an international journal published by the University Darul Iman in Malaysia.

Dr Stefan Clerens was appointed Lead Guest Editor of a Special Issue on Food Proteomics for the International Journal of Proteomics.

Dr Paul Newton was appointed Lead Author for the Australasia Chapter of the IPCC 5th Assessment Report, scheduled for completion in 2014.

Dr Pip Gerard was invited to co-author a report on climate change and invertebrate genetic resources for food and agriculture for the FAO Commission on Genetic Resources for Food and Agriculture.

Dr Barbara Barratt was appointed as associate editor of the New Zealand Journal of Agricultural Research.

Dr Katja Rosenfold and **Dr Simon Lovatt** were appointed section editors of the 2nd Edition of Elsevier’s Encyclopedia of Meat Sciences.

Cesar Pinares-Patino was appointed to the Editorial Board of the journal Archiva Zootechnica.

Dr Cecile de Klein was appointed Principal Investigator of the New Zealand Agricultural Greenhouse Gas Research Centre.

Dr Simon Lovatt was elected a Fellow of the Institution of Professional Engineers New Zealand.

Dr John Kean was appointed to the USA National Centre for Ecological Analysis and Synthesis project 12378 working group, ‘Applying population ecology to strategies for eradicating invasive forest insects’.

Dr Stephen Goldson was appointed to the Foundation for Arable Research Strategic Research Committee.

The Encircle Compression Therapy device, manufactured by The Merino Co. and developed with the involvement of the Dr Stewart Collie and the Textiles Science and Technology Team, was an award winner in the 2011 Medical Design Excellence Awards held in New York City.

The reading room at the University of Otago’s Abbey College was named in honour of AgResearch Scientist Emeritus **Dr Margaret di Menna**. Dr di Menna was the first woman PhD graduate from the institution in 1954.

The Ruakura Clover Root Weevil Bio-control team (Dr Pip Gerard, Derrick Wilson and Tina Eden) received the Hamilton City Council Agricultural Science Award at the 2010 Kudos Hamilton Science Excellence Awards for their research on clover root weevil and the successful release and distribution of the bio-control agent in the North Island.

Dr Chris Morris received the McMeekan Memorial Award from the New Zealand Society of Animal Production for his substantial contribution to animal production over the last five years, with a particular focus on facial eczema and parasites in cattle.

Tom Fraser was made a Life Member of the New Zealand Grassland Association.

Dr Cecile de Klein obtained a Global Research Alliance Senior Scientist (GRASS) award to visit research institutes in Europe for three months to learn about their N₂O mitigation research.

AgResearch company **Grasslanz Technology Limited** was recognised with the Best Use of Intellectual Property prize at the prestigious New Zealand Trade & Enterprise International Business Awards and also named a category winner of the 2010/2011 DuPont Australia and New Zealand Innovation Award – the only New Zealand company to receive such an accolade.

Charlotte Bouchet was awarded a QEII Technician’s Award for study at the Moredun Institute in Scotland for three months, investigating the development and implementation of a nematode protein expression system, and **Lincoln Harper** was awarded a QEII Technician’s Award to train in molecular biology techniques at the University of Hertfordshire, UK.

International Mobility Fund (IMF) Grants: **Dr Rachel Anderson** was awarded a grant to visit the University of Wageningen to study the effect of lactic acid bacteria on intestinal immune homeostasis.

Dr Emma Bermingham was awarded a grant to visit the University of Illinois to study food-microbe-host interaction in the domestic cat.

Dr Sean Marshall was awarded a grant to support development of a new collaboration with researchers from University of Tennessee, identifying microbes in insect guts and looking for possible industrial or animal health applications.

Dr Sean Marshall and **Dr Jana Monk** received IMF grants under the New Zealand/Federal Republic of Germany Scientific & Technological Co-Operation Agreement Programme. Dr Sean Marshall’s grant was for study at the Julius Kühn-Institut in Darmstadt, Germany investigating insect pathology questions for development of bio-microbial control; and Dr Jana Monk’s grant enabled her to study at the Leibniz Centre for Agricultural Landscape Research, Germany.

Dr Dairu Shu was awarded a Royal Society of New Zealand travel scholarship to visit Zhejiang Academy of Agricultural Sciences as part of the New Zealand/China science exchange programme. She studied recombinant heat-labile enterotoxin (rLTB) expressed in yeast as a vaccine adjuvant in the pig model.

Dr Steve Wakelin was awarded a Durmont D’Urville New Zealand-France collaboration grant to visit the Laboratory of Microbial Ecology of the Rhizosphere and Extreme Environments Institute (LEMIRE), Marseille, France.

AgResearch Board of Directors



Dr Jane Adams	Danny Chan	John Loughlin	Susan Huria	Dr Michael Dunbier	Sam Robinson <i>(Chair)</i>	Barry Harris
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	2011 Actual	2011 Budget	2010 Actual
Total Operating Revenue \$k	158,348	157,632	155,785
Total Operating Expenditure \$k	150,104	151,246	152,545
Net Surplus Before Tax \$k	8,524	5,086	2,045
Net Surplus/ (Deficit) After Tax \$k	6,209	3,505	(8,592)
Total Assets \$k	257,553	256,715	257,844
Value of Shareholders' Investment \$k	195,084	198,278	186,529

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OUR COMBINED EFFORTS TODAY WILL PROVIDE TOMORROW'S PROSPERITY



