

# AgScience



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**WELCOME** to our latest issue of *AgScience*, which majors on the material from last year's Canterbury Section forum on the knowledge and skills required for our sector in the next two decades. A key capability to emerge is that of critical data analysis, which – as a scientist, of course – I don't find particularly novel. However, given the emergence of our ability to generate incredibly large data sets, the added dimension is the ability to select and use the right tools to make sense of it all. The other observation I would make is the reality that this skill set is no longer the preserve of professional science-based organisations, but will be embedded in all out-sector players. That brings with it the challenge of maintaining vigilance about the quality and robustness of the analyses, a task for which our established scientific practises of full disclosure and peer review are still highly relevant.

Another feature of the day was the incredibly diverse range of educational approaches now available to those entering the sector: beyond the well-recognised tertiary providers into secondary level, within-employment, iwi-based and specialist leadership programmes. The Agribusiness NCEA curriculum developments are particularly exciting, which is why we chose to highlight this initiative in *AgScience*. I wish Peter Hampton and the wider team every success and would encourage our members to make connections to those ten

regional schools and support the initiative where appropriate.

A report on the performance of New Zealand's Science and Innovation System emerged from the Ministry of Business, Innovation and Employment in December last year. There was little direct information relevant to our sector, but a couple of points are worth noting. The quality of our publications in the applied biological sciences rates well in terms of citation metrics, relative to the OECD average. What is somewhat disturbing is the low proportion of businesses reporting innovation-driven sales (~10% relative to the New Zealand average of 18%) given that business R&D spend on the primary sectors is just over 40% of the reported total of \$444m a year. It was pleasing to see the work on clover root weevil as one of the five highlighted science stories in the report.

I recently had a look through the draft Forage Strategy produced by Morrison Consulting on behalf of NZPBRA, DairyNZ, FAR, B+LNZ, MPI, FANZ and AgResearch. The document provides a good situation report for this part of the sector, particularly the challenges presented by an industry with many diverse stakeholders and many diverse soil/climate/system contexts in a relatively small domestic market. My overwhelming impression is to wonder how will it be possible to devise an overarching strategy, rather than a "wouldn't it be good if we did

this" wish list. To me a strategy is a guide for investment, as much about what we won't do as what we will do. It seems that with so many small-scale stakeholders the biggest challenge is the cat-herding one – we must avoid having our limited public-good resources being chewed up in co-ordination processes. I look forward to the full version due in March and hope that this valuable piece of work has some real impact with our major investors.

We now have a date for this year's general election, and your council will be planning a political forum to give an opportunity to engage with the various parties on primary sector and science policy. Your input into the questions we pose would be welcome. Another key event in the coming year to put in your diary is our "Plant Science Central" joint conference with the New Zealand branch of the International Association of Plant Biotechnology and the NZ Society of Plant Biologists, to be held in Palmerston North during July (see below).

Finally, a nod to another award that was presented late last year. Your committee awarded the AGMARDT Technology transfer award to Dr Katherine Tozer of AgResearch and the team she leads developing and maintaining the AgPest web resource <http://agpest.co.nz> Do check it out online.

– Mike Dodd  
President NZIAHS



PLANT SCIENCE CENTRAL CONFERENCE

# Plants in a Changing Environment

4-6 July 2017

Massey University, Palmerston North

For more information go to: [www.agscience.org.nz](http://www.agscience.org.nz)

Papers on any topic of interest to our members will be accepted but we anticipate sessions on:

Breeding for Complex Traits, Plants and their Environment, Postharvest Technologies, Plant Development, Biotechnology for Industry, Plants for Health, Germplasm Conservation.

*The Plant Science Central Conference is jointly organised by The New Zealand Institute of Agricultural & Horticultural Science, the New Zealand Branch of the International Association of Plant Biotechnology and the New Zealand Society of Plant Biologists*

# Anti-science holds a Trump card

**LIKE IT OR NOT**, science is sometimes political.

The head of the New Zealand Association of Scientists said so in a press statement in which he expressed deep concern at the impact of the new US administration.

Reacting to just two weeks' experience with the Trump Administration's way of doing things – and undoing things – NZAS President Craig Stevens said "We are witnessing a geopolitical shakeup that is without precedent."

His statement echoed expressions of concern among scientists around the world that President Donald Trump is hostile to science and wants to put a stop to research which shows the effect of human activity on global warming. The new president has claimed global warming isn't real and was made up as a Chinese hoax to keep American companies uncompetitive.

The White House climate change website was taken down on the Trump team's first day in office. It was replaced with an energy policy that aims to scrap Barack Obama's landmark climate plan and limit the remit of the Environment Protection Agency.

The new administration also froze new scientific grants at the EPA, which gives out billions of dollars every year to fund research and projects throughout the country, helping to track air pollution, restore watersheds, support researchers studying environmental problems, and so on.

One of the early edicts from the Trump White House ordered Government scientists not to talk about their research.

One magazine reminded readers that scientists in Canada experienced a similar gag under the Conservative government of Stephen Harper. Under his government from 2006 to 2015, the country restricted communications by federal scientists, shut down important research stations, phased out the role of federal science adviser, and generally ignored evidence in policymaking.

Trump's appointments give further cause for disquiet. He appointed Scott Pruitt, who is pro-industry and anti-regulation, to head the EPA. Pruitt refers to himself as the "leading advocate against the EPA's activist agenda."

Mick Mulvaney, the new head of the White House's Office of Management and Budget, last September asked on Facebook: "...what might be the best question: do we really need government funded research at all?"

Betsy DeVos, Trump's choice as secretary of education, is a member of the Christian Reformed Church in Northern America, a group that believes "all scientific theories be subject to Scripture and the confessions" and that "Humanity is created in the image of God;

all theorising that minimises this fact and all theories of evolution that deny the creative activity of God are rejected."

Science writer Jeffrey Kluger, writing in *Time* magazine, reassuringly says President Trump is picking a fight he is certain to lose.

"Science, it's worth remembering, doesn't read your Tweets," he wrote in an article on January 27. "It doesn't care about the size of your Electoral College victory. When rising oceans swamp coastal communities or unvaccinated children fall to outbreaks of measles or mumps or whooping cough, you can't pin that on a crooked media or a rigged election. It's simply the way the fact-based world works. That's a lesson the Trump Administration had best learn – before we all pay the price."

In his press statement, Dr Stevens said the NZAS – an independent body – has six aims in its mission to promote science, each of them likely to be impacted by the radical changes being wrought in the United States.

He listed population, climate, equality, health and environment among the many challenges facing mankind.

"It's one thing to make science struggle to support and justify its activities – that is only appropriate," he said. "It is quite another to actively hunt it down and tear down truths."

He then raised the issue of science funding and the serious consequences for everybody if science – and other forms of scholarship – are ignored and undermined. This is an election year in New Zealand and a time when scientists need to support the values they want for the future.

And finally: "If you think science is apolitical, then ask yourself whether you also believe science can work under all political regimes."

To underscore this, reports from the USA portended NASA's climate change research being scrapped in favor of space exploration.

The New Zealand Government, more encouragingly, was announcing around \$2 million of funding for five studies as part of the Deep South National Science Challenge, which aims to help New Zealanders adapt to the effects that climate change will bring.

And at a conference in Wellington, Federated Farmers delegates from 24 branches around the country unanimously passed a 12-point Federated Farmers Policy on Climate Change.

They called for greater investment in research efforts to reduce biological agricultural emissions and said it was worth accessing all the tools of modern biology, including biotechnology, although (with the bottom line plainly in mind) "the measures should be cost-effective and not at the expense of farm productivity." 🌱



# TOWARDS 2030

## The capability challenge

In deciding on the topic for the forum 'Towards 2030: Knowledge, Values and Skills for Land-based Industries in Canterbury', the organising committee was strongly influenced by a report released by the Ministry for Primary Industries in April 2014 titled "Future Capability Needs for the Primary Industries in New Zealand".

The report sought to understand future capability needs and determine how they might be shaped to lift productivity and profitability. It was written in the context of both primary industry and Government wanting to double export returns by 2025, and doing this in a sustainable way.

To achieve this the report acknowledged the importance of attracting young people with both basic and higher-level qualifications, and from a wide range of core subjects. Employment in the primary industries was projected in a "business-as-usual" forecast to increase to 370,000 by 2025, while implementation of the various primary industry strategies is projected to expand employment within the industries by a further 33,000 to 403,000 individuals by 2025.

The report talked of increasing demand for more people in occupations with higher qualifications, especially for professional degrees in fields of specialisation aligned with the value chain, including areas such as integrated farms systems. It made it clear that we need to increase the skill level across the board. This means that even roles that have traditionally not required formal qualifications will increasingly need greater skills and an increased demand for on-the-job and professional training.

This all sounds fantastic in theory but, pragmatically, educating, training or even finding the right number of people over the next nine years is a big challenge due in no small part to constantly shifting goal posts and major challenges like the burgeoning rural-urban divide. Taking these considerations into account, educators, employers and industry groups were asked to outline their approaches to keeping on track with what is thought to be needed in future at the 2016 NZIAHS Canterbury Forum. ☒

– Prof Jon Hickford

## Knowledge, values and skills for land-based industries

*Ensuring that the right number of the right people with the right qualifications are entering land-based industries over the next decade is a huge challenge, because of constantly shifting goal posts. With this in mind, educators, employers and industry groups outlined their predictions and programmes for keeping on track, at the 2016 NZIAHS Canterbury Forum, Towards 2030: Knowledge, values and skills for land-based industries in Canterbury.*

**LAND-BASED INDUSTRIES ENCOMPASS** everything from fishing and farming to food science and international marketing. In such a broad sector, where qualification requirements range from nil to PhD, technology is moving fast, and knowledge and skills can become redundant overnight, there is no one-size-fits-all solution for training and developing personnel. A range of education providers offer training from NCEA to adult education programmes.

**Peter Hampton, from St Paul's Collegiate**, explained to the forum how the school is collaborating with the Ministry of Education, NZQA and industry partners to create an Agribusiness curriculum for high schools. The programme, which kicks in at NCEA Level 2, is targeted at "the best and brightest" students who are excelling in science and commerce subjects. It will be trialled in ten schools across New Zealand this year. Partners are funding professional curriculum writers who are developing agriculturally focused material that can be taught within existing subject areas like commerce, biology, chemistry, geography, food and digital technology and new NCEA Levels 2 and 3 Agribusiness achievement standards around themes of agri-innovation, agri-science, agri-management and finance and agri-marketing. It is hoped that targeting capable students with academic, rather than unit standards, will help to dispel the common belief that land-based careers are all about long hours and bad pay.

The programme was welcomed by **Federated Farmers National President William Rolleston**, who said land-based industries have an image problem.

"Farmers have to be smart," he said. "It's critical that we attract

the best and brightest as a first choice, not a last choice. We need a multi-pronged and sustained effort at all levels to promote primary industries and primary industry careers. The next generation of farmers will need to rely less on intuition and more on critical thinking and data analysis."

The importance of analytical skills was similarly highlighted by **Warrick Catto, from Ballance Agri-Nutrients**. Since about 2008, he said, the company's staff have had to understand more than basic agronomy, with the focus shifting to more technical issues including water-use efficiency, greenhouse gases, cadmium, nitrogen and phosphorus losses, and compliance tools. This has led to their broadening their employment focus to include behavioural competencies such as analytical skills and data management.

This approach was supported by **Professor Jon Hickford, from Lincoln University**, who emphasised the importance of critical enquiry and reasoning, reminding the audience of the need for people who can actually solve problems, not simply identify them.

**Lincoln University Vice Chancellor Robin Pollard** explained how the Lincoln Hub would encourage collaboration and help to develop links between students and industry. He said he wanted "to change the rules to allow Hub partners to do things like design and teach approved courses, provide internships and supervise PhD students".

**Grant Bennett, from Ara** (formerly CPIT) outlined the institution's review of qualifications which is aimed at turning out graduates who are better suited to the workplace. Such moves would be likely to be welcomed by **Associate Minister of Tertiary Education, Skills and Employment, Louise Upston**, who said she would like the Tertiary Education Commission to be more flexible.

Other speakers discussed options for on-the-job training.

Student Mike Liao designed a machine for grape picking, leaf clipping and pruning while sitting.





**Caitlin Ballisat, from PGG Wrightson**, discussed her company's internal training programme, which included graduate training and programmes for those with no university qualifications, while **Andrew Priest and Andy Macfarlane** explained how Ngai Tahu Farming's Whenua Kura agricultural training programme provides a pathway for Maori to gain qualifications and employment within the land-based sector. Ngai Tahu take a quadruple bottom line approach, aiming for a balance of social, economic, environmental and value based/cultural returns.

Mr Macfarlane also welcomed the opportunity to discuss his "pet subject - the professionalism of agriculture". Like several other speakers he highlighted the increased skill base required for success in primary industries today and moving forward.

Beyond the farm gate there was a call for other skills, with ANZCO's **Graeme Harrison** joining Synlait's **John Penno** in calling for the universities to deliver entrepreneurs, while **Ian Proudfoot, from KPMG**, explained the importance of companies and individuals understanding the importance of intangible factors such as foresight and scanning, risk taking ("fail fast, move on") and real collaboration.

**Lincoln University's Patrick Aldwell** said such factors were often the focus of Kellogg projects, where scholars aged from 25 to 55

researched topics of relevance to their industry or community, while developing leadership and management skills.

**Professor Jon Hickford** concluded that for New Zealand, "a small



PGG Wrightson in partnership with the Get Ahead programme

country at the end of the world", to maintain its primary production base, downstream industries and export income, we have to be better and smarter at what we do than other countries. He noted that Ms Upston's talk suggested there was political goodwill to get this right and that educational institutions from high school through to post-graduate level were also responding. ☑

— Anna Heslop

## What agribusiness leaders are saying about industry training

**KPMG, THE GLOBAL AUDIT**, tax and business-advisory company, each year publishes the latest insights and megatrends relevant to New Zealand's agribusiness sector in its *Agribusiness Agenda* publication. To gather information for the 2016 *Agenda* under the direction of Ian Proudfoot, the company's global head of agribusiness, KPMG sought input from more than 150 primary-sector leaders during a series of roundtable discussions. The resultant report was published just a few weeks before Mr Proudfoot spoke to the NZIAHS forum at Lincoln University.

Key findings from those discussions included:

- There is a growing recognition among leaders that doing what is right by the environment is the only responsible course of action. Some industry leaders suggesting it is untenable for agriculture to remain outside the Emissions Trading Scheme in the medium term.
- For the sixth *Agenda* in a row, biosecurity was again ranked as the number one priority by industry leaders who highlighted the need to focus on preventing risks from reaching our borders.
- An independent body should be established to facilitate the "hard conversations" the country needs to have on topics such as New Zealand's policy on genetic modification, future land use, the role of foreign investment, and intensification of farming.

On the issue of training, careers and capacity-building, the *Agenda* noted that the Ministry for Primary Industries two years earlier had forecast the industry would need 50,000 new people (over and above normal levels of employee turnover). KPMG's discussions with sector leaders established there was much to be done to ensure this. "It is no longer an option to sit back and wait for the education system to deliver the people the industry needs," the report says.

There was a consistent view during the pre-publication discussions that organisations needed to be engaging in programmes geared to

appropriately equip future employees to succeed. This would require interaction with schools to ensure teachers understood the career opportunities available in the agribusiness sector and that they were incorporating relevant material into the general curricula.

"The diverse nature of skills required in primary-sector businesses continues to grow," the report said. "There is a demand not only for predominately physical roles (such as fruit pickers or labourers) but also for highly technical science, marketing and managerial roles".

The fractured nature of the tertiary education sector serving the industry was identified as a threat to the sector's need to attract and retain the people it needs. Strong views were expressed to KPMG that there were too many organisations providing both academic and vocational training. This was impairing the quality and consistency of the training being delivered.

One question raised during the discussions was whether New Zealand should consolidate the food, agribusiness, farming systems and veterinary activities across the country's universities into a single multi-university campus. "The world-renowned Wageningen University in the Netherlands invigorated student recruitment when the region was rebranded Food Valley," the report said. "This was highlighted as one example of what we need to do to create more excitement around our tertiary system."

The issue of government regulation of agribusiness and the role scientists should play featured in the report, too. Concerns were expressed to KPMG that "regulatory positions have run ahead of the science". Instead of addressing key environmental issues, too many of the frameworks were focused on a single variable such as nitrogen run-off. The focus was on managing this one variable rather

than taking "a whole-of-system perspective to drive better, more efficient, environmentally robust farming businesses". ☑

— Bob Edlin



# Agribusiness – a new NCEA learning initiative for schools

## THE PROBLEM

Agriculture is how New Zealand earns a living and together with forestry generates about 70% of our merchandising export earnings and around 12% of Gross Domestic Product, according to Ministry for Primary Industries data.

The primary industries and government agencies are telling us they need the brightest and the best students to take up careers in agribusiness.

“The Government has set an ambitious target of doubling our primary-sector exports by 2025. To get there we will need investment, innovation, market development and a skilled workforce. The government estimates the sector will need to employ another 50,000 people by 2025, half of them requiring tertiary or level 4 qualifications.” This was said by Nathan Guy, Minister for Primary Industries.

The agribusiness sector in New Zealand has major skill shortages across the value chain now, let alone in the future.

“The forecast findings show that across the primary industries there will be a growing demand for professional skills such as engineering, science, and management. [and]...the workforce of the future may look very different. In many cases jobs will be more specialised and will require people with strong educational backgrounds... and an increasing demand for more people in occupations with higher qualifications, especially for professional degrees in fields of specialisation aligned with the value chain.” This comes from the Ministry for Primary Industries in a publication titled *People Powered*.

Part of the problem is that agricultural and horticultural science does not have a high profile as a career pathway. The public perception is that agricultural and horticultural courses are for less able students.

School and community perceptions of the importance of agribusiness to New Zealand needs improving, and the opportunities and pathways that are available are not recognised or well known. In particular there is a need to engage the urban sector with the primary sector which politically is so very important for New Zealand's future. There is an urgent need for initiatives that provide a better link between secondary schools, tertiary institutions and the agribusiness sector.

## THE SOLUTION

St Paul's Collegiate School successfully established partnerships with a range of key businesses and organisations from the agribusiness sector and together they have developed an Agribusiness programme for secondary schools in New Zealand. We believe this will meet the industry's long-term needs to develop highly skilled and motivated young people, required for a sustainable future of the primary sector. This is a pioneering programme of national significance that will stimulate careers in agricultural science and business and encourage tertiary-capable young people to select career pathways in the sector.

Agribusiness at NCEA Levels 2 and 3 is defined as a course of study that integrates primary industries and business beyond the farm gate, encompassed by a group of sectors (agriculture, aquaculture, dairy manufacturing, equine, forestry, horticulture, seafood, and sports turf) that form the basis of modern food production. The

current Agricultural and Horticultural Science subject is up to the farm gate and is predominately focused on the management practices involved in the production of food.

Agribusiness achievement standards have been written under four strands – Agri-science, Agri-innovation, Agri-management and Finance and Agri-marketing. The standards are designed to be taught across all the primary-industry sector contexts.

This year the Ministry of Education has approved ten New Zealand secondary schools (Mt Albert Grammar, St Paul's Collegiate School, Feilding High School, New Plymouth Boys High School, Lindisfarne College, Christchurch Boys High School, John McGlashan College, Columba College, Southland Boys and Southland Girls High Schools) to trial draft new Level 2 and Level 3 NCEA Agribusiness achievement standards. Teaching and learning guides have been written and assessment items are being developed with the New Zealand Qualifications Authority. They are designed to attract bright, academic tertiary-capable senior students into universities and onwards into the many career pathways and opportunities that the agribusiness sector provides, a sector where New Zealand has a shortage of graduates.

St Paul's Collegiate School, Hamilton, along with 12 Agribusiness-sector partners and the Ministry of Education, have driven this initiative, which has been recognised in political circles as an exciting and essential way of meeting our country's future economic aspirations. This year at St Paul's alone we have more than 100 academically capable students taking Agribusiness at NCEA Levels 2 and 3. Across the country in our trial schools we have around 350 students involved.

The initiative has received overwhelmingly positive endorsements from the agribusiness sector and we have many secondary schools clamouring to get on board with us. We are also organising a National Agribusiness Conference ([www.agribusiness.school.nz](http://www.agribusiness.school.nz)) to be held at St Paul's from 20–22 April 2017 for interested educators. We are confident that more than 100 schools will be teaching Agribusiness by 2018, with potentially an additional 750 Year 13 students graduating from school to agribusiness courses at universities by the start of 2019. ☑



Angus Kelly and Connor Gordon, students from St Paul's Collegiate School receiving a cheque for winning the 2017 Fieldays Young Inventor of the Year for their post hole borer.



# Water targets

**THE NEED FOR** greater environmental science capability in the primary sector was highlighted when Environment Minister Nick Smith last month announced new measures to improve the management of New Zealand's rivers, lakes, aquifers and wetlands. The accompanying discussion document contained 23 initiatives, including national regulations to get stock out of waterways, strengthening the national requirement on councils to set limits and standardised water-permit conditions on efficient use of water and minimising nutrient loss.

Federated Farmers spotlighted the importance of good science in the press statement it issued in response to the Government's freshwater reform programme.

Water spokesperson Chris Allen said the swimmability target of 90% by 2040 was a "stretch goal" but very early feedback suggested freshwater in some regions could be improved and restored in relatively short timeframes.

Meeting the Government's target was "all entirely doable", if everyone played their part. Farmers had been encouraged by the results that they had achieved in their own catchments, from their own efforts.

"Now we need better science and monitoring processes to really nail what we need to work on, where we do it and how," Mr Allen said.

He welcomed the Government's provision of \$100 million for the Freshwater Improvement Fund.

"We'd like to see this funding channelled into some significant scientific research and innovation to boost our ability to achieve the targets the government, and our communities, will set."

The Cawthron Institute also welcomed the Government's latest package of freshwater reforms. Freshwater scientist Dr Roger Young said he was pleased to see increased transparency was a core feature of the new programme.

The wide availability of data on what was happening in New Zealand freshwater "will greatly improve our understanding and ability to improve our freshwater environments".

Dr Young also said it was important science continued to inform the debate.

The Government last year highlighted the importance of freshwater science when it announced Our Land and Water – Toitū te Whenua, Toiora te Wai, the largest of 11 National Science Challenges. The Challenge's aim is to enhance New Zealand's primary sector economic contributions while improving the environment.

Funding at the time of the announcement was nearly \$100 million over 10 years, to be supported by additional co-funding of up to \$130 million from the crown research institutes.

The Challenge is hosted by AgResearch, whose research partners are University of Auckland, the Institute of Environmental Science and Research (ESR), GNS, Landcare Research, Lincoln Agritech, Lincoln University, Massey University, NIWA, Plant & Food Research, Scion, and University of Waikato.

At the time of the more recent announcement and the setting of a swimmability target, ESR was advertising for a groundwater scientist for its Christchurch Science Centre, to join a research team whose work addresses issues associated with land-use intensification and its effects on groundwater quality.

Environment Canterbury was looking for a Team Leader Hydrological Science to join its Surface Water Science Team in Christchurch, to bring "robust scientific approaches to the management of Canterbury's fresh water resources". The successful

candidate would join a section charged with maintaining and improving the quantity and quality of surface water "in an environment of changing land use and a diverse landscape".

The Bay of Plenty Regional Council was advertising for two environmental scientists to join a team which is working under a newly developed science strategy.

Milly Farquhar, who became an environmental science officer with the Bay of Plenty Regional Council, features on the Massey University website with an endorsement of the environmental science course she had taken. Her Bachelor of Science (Environmental Science) degree had prepared her for many of the fundamental skills needed to do her job with the council, she said. It also gave her a good base line of technical knowledge.

She predicted: "Environmental science is a field that will continue to grow" and "as the state of our environment continues to decline we are going to need more and more people managing and researching our natural resources".

The university advised potential students that several paths were open to graduates with a BSc in environmental science who wanted to turn their interest in the environment into a career. Potential employers in this country and overseas included central government, regional, district and city councils, private sector consultants, and entrepreneurs. Graduates might find employment in a raft of other areas including agriculture and forestry.

AgResearch was looking for staff, too, including a Principal Scientist – Farm Systems and Environmental Sciences. This was described as a newly created senior and influential science role to provide vision and leadership in New Zealand's leading pastoral sector research organisation based at Lincoln Hub. The Principal Scientist would be responsible for providing "science thought leadership" in the Farm Systems and Environment Group and for integrating component research from across AgResearch in a farm-systems context. The successful candidate's attributes would include strong expertise in farm systems across animal, forage and environmental sciences.

This gels with AgResearch's statement of core purpose, which says the Crown Research Institute will work with other research providers and end-users to contribute to several developments including biosecurity, land, soil and freshwater management, and climate change adaptation and mitigation.

Plant and Food's statement of corporate intent refers to the growing importance of collaboration with research and industry partners through New Zealand's National Science Challenges, particularly through participation in High Value Nutrition, New Zealand's Biological Heritage, and Our Land and Water.

Landcare Research's Statement of Corporate Intent for the 2016–2021 period sets out how the institute will contribute to its shareholders' and customers' goals and says its expertise is aligned strongly with the needs of the public sector. The institute will increase its focus on regional development opportunities and challenges to meet the rising demands of government agencies for insights and tools that integrate policy and regulation. And it "will meet increasing demands for science and innovation to support the national water reforms".



Milly Farquhar... "Environmental science is a field that will continue to grow"





## Obituary

Dr Rod Bielecki (1931- 2016)

Dr Rod Bielecki, MNZM, FRSNZ, died late last year after a short illness. He was director of the Division of Horticulture and Processing at the DSIR from 1980-1988, a former President of the New Zealand Society for Horticultural Science and an Honorary Fellow of the New Zealand Institute of Agricultural and Horticultural Science.

Rod was born in Auckland where he lived for most of his life. He studied chemistry and botany at Auckland University College and completed an MSc on kauri regeneration. Then he undertook a PhD on sugar uptake under Sir Rutherford Robertson at the University of Sydney.

Rod joined the staff of what then was the Fruit Research Division in 1958 and became a leading member of an exceptional group of plant scientists at Mt Albert. He had periods of leave overseas, including a particularly productive period with George Laties at the University of California, Los Angeles. But unlike many of his generation, he returned to New Zealand and spent the rest of his professional life here before retiring in 1996.

He had been appointed to strengthen DSIR's horticultural research, to extend the findings of the Appleby Trial, focussing on apples, especially their response to phosphorus nutritional status. New Zealand soils are often deficient in phosphorus and it was therefore very appropriate that phosphorus nutrition remained central to his work. However, he developed a more comprehensive interest in the nutrition of plants, the allocation and redistribution of nutrients, both mineral and carbohydrate, and the responses to stress and senescence. Highlights of his research career include the demonstration of active sugar transport in sugarcane, the demonstration that phosphate in the plant cell is apportioned into different cellular compartments or pools, the study of polyol transport and nutrition, and studies on nutrient loading into individual sieve tubes of excised phloem tissue.

Rod was a highly skilled and innovative experimental scientist and contributed to the development of plant extraction procedures and the development of flat-plate acrylamide gel electrophoresis systems, techniques that are now standard experimental procedures. He was among the first to use <sup>32</sup>P, the radioactive isotope of phosphorus, in plant studies.

Rod was passionate about his science and wrote well, placing great emphasis on the communication of scientific results both to fellow scientists and to non-specialists. In one of his more colourful phrases, he described scientists who did not publish their results as indulging in mental masturbation. He spent many hours in editing and in helping younger scientists learn how to write well.

He received many distinctions throughout his career: a National University Scholarship, a Senior Fulbright Scholarship, a Doctorate of Science from Sydney University, the Research Medal of the New Zealand Association of Scientists, Fellowship of the Royal Society of New Zealand, the Hector Medal of the Society, Honorary Fellowship of the New Zealand Institute of Agricultural and Horticultural Science, Life Member of the New Zealand Society of Plant Biologists, and election as an Associate of Honour of the Royal New Zealand Institute of Horticulture. He was appointed a Member of the New Zealand Order of Merit in 2010.

I first met Rod in 1962 when I spent three months working with him as a summer student at Mt Albert. Those three months changed my life. I was lucky to be able to work in a very good scientific laboratory and this was the first time I had met real professional scientists. Rod was an excellent role model and mentor. He considered it his responsibility, particularly during his period as director of a DSIR division, to foster the personal development of individual staff members. His enthusiasm for science was infectious and we learnt the importance of good, unambiguous experiments intended to providing answers. More important, for many of us he was a good friend.

Rod not only studied plants professionally; he also enjoyed plants. He specialised in orchids and begonias. In retirement, he was active in voluntary horticultural societies including the New Zealand Camellia Society, the South Auckland Orchid Society, the Auckland Begonia Circle and the Friends of the Auckland Botanic Gardens. He served on the Friends Executive, was President and an Honorary Life Member, and he edited the Friends' newsletter for many years. His own articles became a greatly anticipated feature of each issue of the newsletter. As Jack Hobbs, Manager of the Auckland Botanic Gardens commented, "It is a rare talent for someone to communicate often complex science in such an accessible manner that can be enjoyed and understood by everyone."

Rod is survived by wife Val and daughters Karen and Lisa, his son-in-law Kendall and grandson Jack. ☒

– Dr Ross Ferguson, ONZM

## New members We welcome

Brian Clayton (Auckland)  
Niels Nieuwenhuizen (Auckland)  
Felipe Haiduck Pimentel (Auckland)  
Beth Hampton (Waikato)  
Peter Singleton (Waikato)  
Leila Doleh (Manawatu)  
Dave Geary (Manawatu)  
Sunny George Gwanpua (Manawatu)  
Leo Lai (Manawatu)  
Svetla Sofkova-Bobcheva (Manawatu)  
Jeritah Tongonya (Manawatu)  
Jacqueline Oseko (Manawatu)  
Xi Xu (Manawatu)  
Mariann Brennan (Canterbury)  
Helen Ivey (Canterbury)  
Mark Paget (Canterbury)  
Morgan Shields (Canterbury)  
Katherine Simpson (Canterbury)  
Matthew van Voorthuizen (Canterbury)

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