definingnz

APRIL 2009

Future landscape

Growing smarter: Innovation the key to growth in agri-food – the nation's key strength

Shedding light on animal therapy

DNA tracing the Māori potato

Recession gives policy makers food for thought

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Steve Maharey

Committed to the nation's key strength

A little over 80 years ago Professors Geoffrey Peren and William Riddet strode across pastures just outside the town of Palmerston North and agreed that an agricultural college should be built beneath their feet.

At the time, agriculture accounted for most of the New Zealand economy and the college was urgently needed to lift the capability of farmers through outstanding teaching and groundbreaking research. Massey Agricultural College was highly successful.

In 1964 the college became Massey University. Over the following decades the University expanded to include Humanities, Social Sciences, Business, new areas of science, Education, and Fine Arts and Design. The original commitment to New Zealand's land-based industries, however, remained.

Towards the end of the 20th century, questions were raised about the future of agriculture. Some thought it a "sunset industry" and wanted new areas of economic activity developed.

Massey agreed that New Zealand should diversify its economy but did not accept that this meant abandoning the nation's key strength. What was needed, people like Professor Robert Anderson argued, was a new vision for agriculture.

This vision drew attention to activity beyond the farm gate where the food industry could add value to the commodities New Zealand had traditionally produced. This vision saw New Zealand sustainably producing more food, increasing quality and adding value.

This was a defining view of not only where land-based industries but also where New Zealand might head. Today it is accepted that New Zealand's future is closely tied to the success of these industries. And it is accepted that we need to transform them by adding value to everything we produce.

This issue of *DefiningNZ* captures the tradition that is Massey and its contribution to the future. It features Craig Norgate, Nicola Shadbolt, Steve Morris and Allan Rae. These people are reshaping New Zealand's view of our traditional industries and Massey is doing everything it can to assist them.

Elsewhere in this issue you will find a profile of one of New Zealand's most respected businesswomen, Alison Patterson, who will be conferred with an honorary doctorate in commerce this week during our Albany graduation ceremonies.

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Growing smarter

Future landscape: Innovation remains key to agri-food growth

definingnz

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For full contact details and enquiries see page 18.

COVER: In the Ag-Hort Lab for the soil properties and processes paper are second-year students Andrew O'Connor, Rachael Phillips and Alastair Neville.

Growing smarter

Innovation remains key to agri-food growth

As global food shortages worsen and governments grapple with the problem of how to feed growing populations with shrinking resources, the agri-food backbone of New Zealand's exports will continue to increase in importance.

Massey has always played a pivotal role in developing the people and the skills that place New Zealand at the cutting edge of what needs to happen to create a sustainable future.

Innovation is vital to cope with the dangers posed by climate change, pollution, water shortages and loss of arable land – and the mantra of "working smarter not harder" is implicit when the world no longer has the ability to simply grow more crops and breed more livestock to feed itself.

The University is already a world leader in the agri-foods area, unrivalled in research, skills development and knowledge transfer.

This month it joined five other food research and development organisations in establishing Food Innovation New Zealand to market the nation's food research expertise to the world.

A memorandum of understanding was signed with AgResearch, Fonterra, Plant and Food Research, the Riddet Institute, and the BioCommerce Centre. The plan is to formally launch the brand in July.

University Vice-Chancellor Steve Maharey, who chairs the Food Innovation steering committee, says New Zealand and its leading food science organisations already have a global reputation for excellence.

"Collaboration between our organisations has helped grow the industry's reputation for providing New Zealand Government and worldwide private sector clients with world-class food research services and capability," Maharey says.

This initiative is the first time the partners have formalised their collaborative efforts. The primary goal is to attract more global food giants to commission research in New Zealand and to establish research facilities here.

Massey Agriculture:

- Total students in agriculture and life sciences: 2500 EFTS (700 postgraduates)
- Current research contracts in agriculture and life sciences: 115 valued at $15.6m
- Farms: 2200ha (three dairy, three sheep and beef, one deer, plus fruit, pasture and crops research units)

Recent farms systems projects include year-round lambing and identifying the most efficient beef cattle for particular farms – both projects have the capacity to feed more people from less land.

Scientific breakthroughs in omega-3 fish oil and calcium-fortified Anlene milk have led to global commercialisation of products with significant health benefits.

The common thread from fish oil to better farm systems is innovation, Maharey says.

The decision to renew the focus on agri-foods last year saw the degree programmes revised and updated. In addition to the world-class Bachelor of Food Technology degree – recently selected by the Singapore Government to be taught there alongside other world-leading technology degrees – this year's crop of students had the choice of degrees in AgriScience, AgriCommerce or Environmental Management in place of the Bachelor of Applied Science programme.

The programmes were developed over two years after extensive consultation with recent graduates, current students, academics and industry. With student enrolments heading for records levels the change appears to have won approval where it counts.

Bridie Virbickas, 18, is among 61 students taking the soil properties and processes paper taught on the Manawatu campus. With 71 extramural enrolments – and another 100 internal enrolments anticipated for semester two – the numbers are well ahead of any of the past three years

Virbickas says Massey's reputation is what drew her from the family dairy farm near Whakatane to do a Bachelor of AgriScience. "Massey's well-known for how good it is at agriculture and the new degrees seem to have got more attention and are more focused," she says.

The soil paper, along with a paper called Plants in Agriculture, is regarded as "indicator papers", says the Director of Massey Agriculture, Professor Jacqueline Rowarth. "When those class sizes are up – and they are this year – we know we're looking at some good numbers graduating in two or three years' time."

"They're keen and motivated students and taking full advantage of all the extracurricular professional development opportunities that Massey Agriculture offers," Rowarth says.

Last year the Pro Vice-Chancellor of the College of Sciences, Professor Robert Anderson, announced the new bachelors degrees saying they underline the University's commitment to building a sustainable nation

Anderson calls them "future-proofing" Massey's agriculture graduates by drawing on the strengths the University has in multiple disciplines and developing partnerships across developing disciplines to provide the skills needed by industry.

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AgriScience is for students planning careers at the interface of science, technology and management in agriculture, horticulture or equine studies, such as technicians, farm or horticultural managers, fertiliser or seed company representatives.

Virbickas says she is enjoying the soils side of her degree and could be interested in a career in the fertiliser industry that might in turn lead to a farm advisory role.

Anderson says AgriCommerce, developed in partnership with the College of Business, is for students wanting to work in the business side of aiming at business related to primary production, such as rural banking, exporting, rural valuation, logistics and supply chain management.

Mark Jeffries

Mark Jeffries has been appointed as Massey University's Agri-Food Strategy Manager, responsible for developing strategy to enhance the University's contribution to the agri-food value chain.

Jeffries will work directly with an executive group including Vice-Chancellor Steve Maharey, Professors Robert Anderson and Lawrence Rose (Pro-Vice Chancellors of the Colleges of Sciences and Business) and Distinguished Professor Paul Moughan (Co-director of the Riddet Institute).

Maharey says a key role for Mr Jeffries is to chair an Agri-Food Leaders Group composed of leaders from across the university.

"We know many groups and people at Massey have strong and productive relationships within the agri-food sector," Maharey says. "But in this tough economic time and when increasing pressure is being placed on our physical resources, we want to do everything possible to ensure we have the most effective communication and the most productive collaboration university-wide.

"Mark's background in the sector – at Meat & Wool New Zealand and Livestock Improvement Corporation, and at the Dairy Farmers Federation in Australia – means that he has both the scctor knowledge and an appreciation of the challenges we are all facing.

"Mark is a key part of our agri-food strategy, enabling better, stronger management of relationships with key partners in the sector."

In an additional capacity, Jeffries is working with both Lincoln and Massey universities to accelerate outcomes from the Agricultural Partnership for Excellence. Two projects of strong interest to the industry are a priority.

The first is a centre for farm systems business management. An early focus of the centre will be to develop an on-going continuing professional development programme for farm consultants. The second is a review of the professional development needs at the governance and management levels of the country's leading agribusinesses. Jeffries has an Honours Degree in Agricultural Science from La Trobe University (Melbourne). ❖

Professor Robert Anderson

"The Bachelor of Environmental Management will provide the career foundation for managers in resources, environments, catchments and parks, as well as for regional planners and policy analysts," he says.

Robert Southward, the co-ordinator of the Plants in Agriculture paper, says the semester one class of 87 internal students is the biggest in at least six years, with the students an even split between AgriScience, AgriCommerce and Bachelor Science, with some Veterinary Science and diploma students as well.

Alastair Neville, 20, started doing a Bachelor of Applied Science last year but switched to AgriScience after deciding "it was the way to go". He came to Massey from his family's dairy farm at Reporoa because of its reputation and variety of programmes.

A key advantage is the ability to study in diverse areas due to the comprehensive nature of the University. "At the moment I'm doing economics as an option and my intention are to do some busienss papers as well," Neville says.

When he completes the degree he plans to work as a farm adviser, rural banking or as a technical sales represenative. "Nowadays having a degree opens more doors. "Dad started farming after fifth form but he says because of the amount of paperwork you do you need business skills. It's also about the science. Agriculture is so much more in-depth." ❖

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Pictured from left: BioCommerce Centre chief executive Dean Tilyard, Fonterra group research and technical operations manager Janneke van Wagtendonk, Riddet Institute co-director Professor Harjinder Singh, AgResearch chief executive Andrew West, Vice-Chancellor Steve Maharey, Manawatu District Council chief executive Rod Titcombe, Plant and Food chief executive Peter Landon-Lane, Palmerston North Mayor Jono Naylor.

From feudal to future-focused

Medieval history is not a subject you would equate with rural business supremo Craig Norgate, but the feudal era preoccupied most of his study in his first year at Massey University.

In a way the study of olde world history and its emphasis on the land use methods of the day is somewhat apt for a man who has made his name transforming the face of the modern-day dairy, meat and wool sectors.

For if Norgate retains a fascination for the past, his business mind remains firmly focused on the future, as it has been since graduating with a business studies degree more than 20 years ago.

The 44-year-old chairman of rural services company PGG Wrightson says his special interest studies and his major both helped him gain a foothold on the career ladder.

"I did find that the core grounding in accounting and finance stood me in good stead for having a real intuition for that aspect of business, which has allowed me to concentrate on the people side of it."

Outside the lecture theatre, his rugby prospects sidelined by a back injury possibly aggravated by a student job delivering furniture, ensured that Massey was also a very social time for him where his main sporting activity "was on the pool table at the Fitz".

But for every beer he enjoyed, the young Norgate also kept a watchful eye on his business activity. He wryly recounts that his focus equally lay on "my fledgling share portfolio".

His everyman grassroots appeal, equally at home in the bar as the boardroom, has helped ensure his survival in a sector he knows faces more tough times.

The rugby-loving son of the Taranaki heartland was a driving force behind the consolidation of the dairy industry, which led to the creation of New Zealand's largest company Fonterra. At 36 he was the country's highest paid chief executive. At 38 when his contract was not renewed he sought new pastures, eventually leading him to PGG Wrightson, another company forged from Norgate's penchant as a dealmaker extraordinaire.

He wants to do for the wool industry, what he helped do for the dairy sector – now coming down from a decade of heady highs.

"It will [experience heady highs] again unless the sheep industry can reposition both meat and strong wool at the top end of the ethical food and fibre markets respectively.

"Dairy will continue to benefit from growth in developing markets with productivity improvements the key to New Zealand farmers benefiting."

PGG Wrightson has even diversified its interests as far as South America, setting up NZ Farming Systems Uruguay to develop dairy farm operations in that country.

Norgate adds to the mounting sense of expectation and pressure on him by declaring that "the [agricultural] sector is in good heart and will be the key to the recovery of the New Zealand economy".

"It always has been when we've been through a recession," he says.

"Partly because we see a drop in the value of the New Zealand dollar and a drop in interest rates, which underpin the profitability of farming, provided it's based on productivity rather than letting costs get out of hand."

And the tertiary sector has a real role to play around science and around talent too.

"Take the dairy industry for example," he says.

Craig Norgate – agriculture will be the key to economic recovery

"It's very much underpinned by the science investment made in the 1970s and 1980s, and that gave us productivity that led the world for quite a time. Under-investment in the late 1990s and early part of the decade is still starting to come home to haunt us a little bit and we really need to step up that investment in science."

It is at this point he sounds a warning to the new government about keeping election pledges like finding a substitute for the now-scrapped $700 million Fast Forward fund investment into rural sector innovation.

"We're certainly expecting the National Government to keep its promise and replace that with something else.

"It's crucial to the New Zealand economy that we get that R&D [research and development] spending above the OECD average. Agriculture is one of the core areas which can get benefit out of R&D so it's one of the first places for the country we can get a good return for that investment."

Norgate notes that while it could be argued National, with its coalition agreement with the Māori Party, has done more for Māori than was achieved under their previous alignment with Labour, the former government had been more active in the agricultural field than its traditional blue ribbon rural standard-bearers.

"So we've got to be very careful that National does not take that rural constituency for granted. Absolutely they have to deliver rather than saying 'they're our natural voters anyway we don't need to do anything for them'."

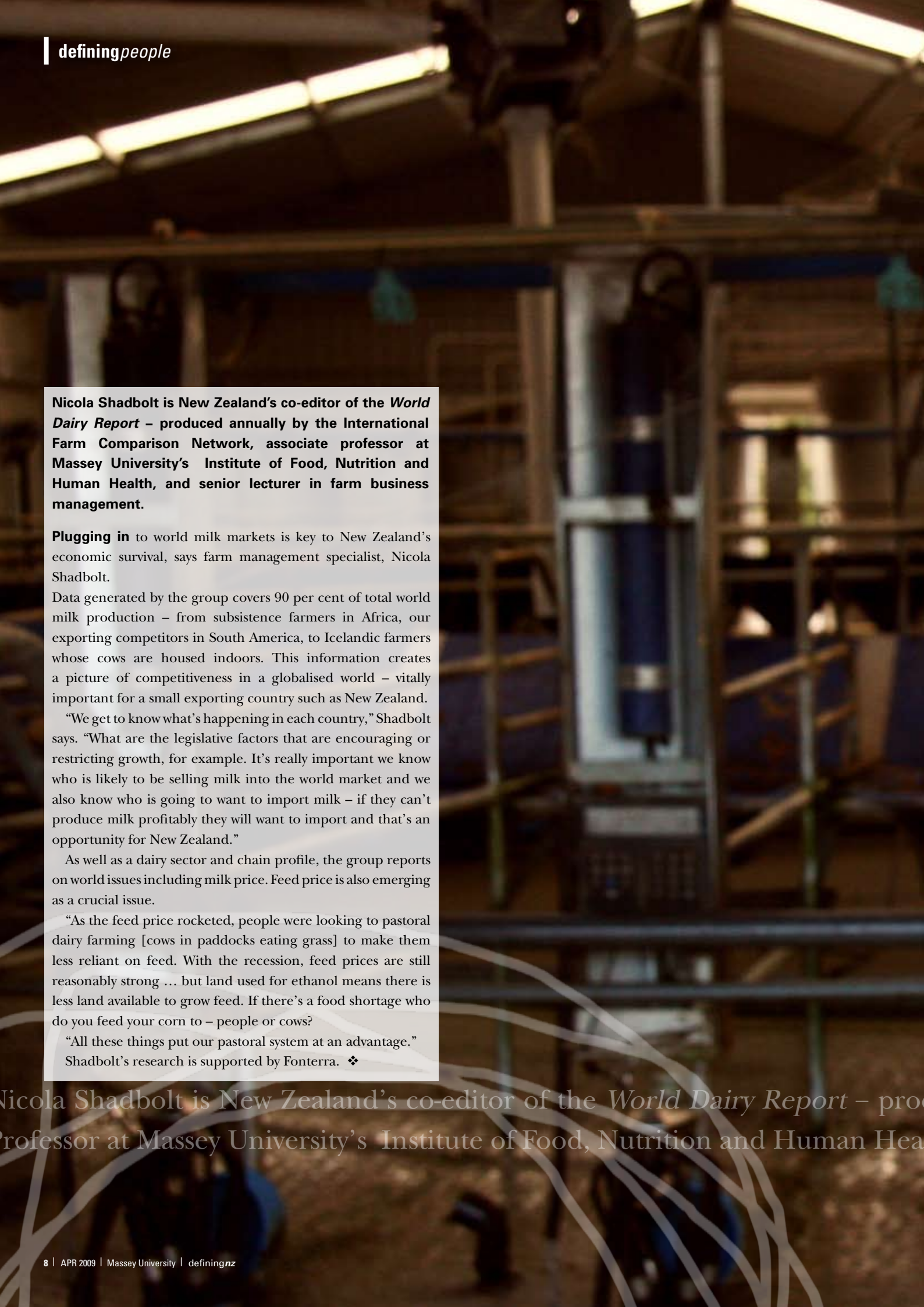
Norgate prescribes a three-pronged strategy to boost productivity.

Short-term is about making sure New Zealand uses the science that already exists – adopting existing technology.

Medium-term there is a need to fill the gap that was left by "a decades" of under investment.

Long-term there is a need to keep feeding the infrastructure.

As part of that it was essential to make use of the "one heck of a lot of degree-qualified people in agriculture in New Zealand". ❖



Nicola Shadbolt is New Zealand's co-editor of the *World Dairy Report* – produced annually by the International Farm Comparison Network, associate professor at Massey University's Institute of Food, Nutrition and Human Health, and senior lecturer in farm business management.

Plugging in to world milk markets is key to New Zealand's economic survival, says farm management specialist, Nicola Shadbolt.

Data generated by the group covers 90 per cent of total world milk production – from subsistence farmers in Africa, our exporting competitors in South America, to Icelandic farmers whose cows are housed indoors. This information creates a picture of competitiveness in a globalised world – vitally important for a small exporting country such as New Zealand.

"We get to know what's happening in each country," Shadbolt says. "What are the legislative factors that are encouraging or restricting growth, for example. It's really important we know who is likely to be selling milk into the world market and we also know who is going to want to import milk – if they can't produce milk profitably they will want to import and that's an opportunity for New Zealand."

As well as a dairy sector and chain profile, the group reports on world issues including milk price. Feed price is also emerging as a crucial issue.

"As the feed price rocketed, people were looking to pastoral dairy farming [cows in paddocks eating grass] to make them less reliant on feed. With the recession, feed prices are still reasonably strong … but land used for ethanol means there is less land available to grow feed. If there's a food shortage who do you feed your corn to – people or cows?

"All these things put our pastoral system at an advantage."

Shadbolt's research is supported by Fonterra. ❖

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Recession in markets gives policy makers food for thought

The rise in the number of shoppers buying local produce is posing a puzzle for policy makers.

With around 80 per cent of produce from farms in New Zealand being exported, agri-food is a major area of business activity.

But one effect of the recession is that customers are choosing to spend their money locally, putting the lucrative export market in danger if consumers in other countries do the same.

Professor Allan Rae, an agricultural economist, leads a team of experts in agricultural trade policy and policy reform at Massey University.

They monitor national and international market and policy trends and the threats and opportunities they offer to New Zealand agrifood businesses.

"It is so important to get trade policies right," he says. "Nations trading products with one another will obtain greatest benefits if they are able to specialise in products in which they are internationally competitive.

"But sometimes trade policies distort markets and prices and farmers and processors may have the incentive to produce goods that would be better imported.

"Not only does this harm that country, but it is also likely to harm other countries whose export sales and returns have suffered."

Known for thinking "outside the barn", his team is taking a fresh look at the situation with the formation of a College Centre for Agribusiness Policy and Strategy at Massey.

Based within the College of Business, the new centre continues and builds on the work of the Centre for Agricultural Policy Studies that was established in 1981. It will enhance teaching and research at the University, help form new policy and engage further with the international community, creating connections that are valuable to agrifood exporters.

"The status change reflects the importance we place on the agri-food industry in New Zealand," says Professor Rae who will lead the centre.

"The move will strengthen the work we have been doing by placing a lot more emphasis on the impact of global food market and policy developments on New Zealand businesses and how trade policy can reflect that to the advantage of New Zealand farmers and agribusiness."

Massey has supported government agencies with analysis and policy advice for more than 20 years but the new centre will have a stronger agri-business flavour.

Professor Rae says this is a step in the right direction.

The team has a proven track record. It has been involved in both the Uruguay and Doha World Trade Organisation Agricultural Negotiations looking at how reductions in tariffs, export subsidies and changes to tariff-rate quotas would impact on New Zealand rural society – in terms of global and national prices, trade flows and economic benefits.

Other ongoing research projects involve policy development in the pastoral sector, using improved land-use modelling to gain a better understanding of how agri-business in different regions within the country might respond to policy reforms. This helps estimate changes in supply, demand and trade for products.

They are looking at how carbon taxes or emissions trading schemes will impose additional costs on some agri-food producers. If foreign suppliers do not face such costs then New Zealand exporters become less competitive.

Long-term there is an in-depth study of the Chinese agrifood market, including supply and demand for meat and dairy products and patterns of change as small producers exit the market.

Staff have also been involved in a Ministry of Agriculture and Forestry project to increase understanding of the major drivers of productivity growth in New Zealand agriculture – including farm extension, the impact of weather, and research and development efforts locally and overseas.

Professor Rae says they are constantly looking at the global picture with an eye on market drivers and trade policies in the European Union, United States and Asia.

"New Zealand has led the way in terms of agricultural policy – by removing taxpayer support for farmers," he says. "But this is a period of great uncertainty in the industry and we must look for new ways to trade and new products to deliver.

"Recent price escalation was the biggest short-term change in the global market since the 1970s, when there was the last sudden peak in prices.

"Those prices have now collapsed as suddenly as they peaked, and are now joined by recessionary forces. With around 80 per cent of agrifood produce in New Zealand being exported, it is key to get trade policy right.

"Massey has a strong reputation in this area and we have a solid platform for moving forward." ❖

Landcorp partnership brings CT scanner to vet hospital

Professors Elwyn Firth and Hugh Blair prepare to scan a sheep.

Consumer demand for leaner meat has led to the establishment of a new computed technology (CT) scanning unit for large animals.

Located at the University's vet teaching hospital on the Manawatu campus, the scanner will be used for any animals that require it, though the initiative came from Landcorp Farming.

A purpose-built facility costing $1.1million has been constructed around the $470,000 Philips scanner, the only one of its type in New Zealand that has an integrated table to allow for scanning of large animals such as horses, whales and cows.

Professor Hugh Blair says the catalyst for has been increasing demand over several decades from consumers who wanted less fat in their meat.

"One solution to this has been to select genetically leaner animals so that over time, the animals become progressively leaner. However, this has proven a challenge to animal breeders as it is difficult to estimate body fat in a live animal. CT scanning provides a non-invasive means of estimating body composition."

Landcorp has used CT scanning in its ram breeding programmes for more than a decade, Blair says, and Massey staff from Institute of Veterinary, Animal and Biomedical Sciences worked with them to establish the new scanning facility.

"Landcorp will use the facility to evaluate ram lambs from their North Island breeding programmes. Other ram breeding operations have also signalled their interest in using the scanner, and in addition to the commercial use, a number of production animal research trials are also lining up to use the facility.

"For example is it possible to measure the amount of brown fat in newborn lambs – brown fat is a primary energy source for newborn lambs and higher levels of brown fat are associated with increased survival rates."

Another example of the scanner's use is in companion animals. Elbow dysplasia is a common condition in many dogs, but is a complex disease with no cure. A dog recently referred to the veterinary teaching hospital had shown outward signs of the inheritable condition. A visit to the CT scanner enabled pinpoint of subtle lesions resulting in early osteoarthritis. The dog will go straight to surgery with the surgeons armed with valuable, precise, anatomical information that will allow for a more comprehensive approach to therapy.

Radiography has been the diagnostic imaging standard of care in veterinary medicine for decades. It utilises x-rays, just like CT, to shine through a patient and yield a shadow of the internal anatomy on a piece of film or computer monitor.

CT also uses x-rays but the x-ray tube spins around the patient and many, small detectors record the pattern of x-ray absorption in the patient. A powerful computer platform uses the data to generate volume sets of images displayed in thin slices of the patient on the screen, reducing the superimposition artefacts and providing exquisite spatial resolution of the patient's internal anatomy.

This exponential increase in information allows the radiologist to be more sensitive and specific in determining the underlying disease process. It also allows the medicine and surgical specialists to more precisely determine the degree of disease and response to therapy on re-check examinations.

Radiologist Dr Angela Hartman says the scanner is being used on Massey clients and on animals that are referred by vets around the country.

"CT scans are very affordable given the amount of information they provide the clinicians involved. They will allow for more success in therapy given the more precise diagnosis."

Another project underway using the scanner is focusing on physiological stress in pregnant ewes.

"With the advanced image manipulation software on this machine, we can investigate some important animal health issues in a way that has never been possible before in New Zealand," Hartman says.

Students are also benefiting from the new facility. "There are a number of veterinary students on imaging rotations who spend a lot of time here, obviously, but also surgical, medicine and anaesthesia students come in to supervise the individual cases they're working on," she says. "We had to oversize the workstation room, as compared to human imaging facilities, to allow the number of students involved in the case to learn from the advanced imaging procedure." ❖

Droplet drift model to improve orchard safety

Mathematics doctoral graduate Sharleen Harper had no idea when she enrolled as an undergraduate that the intricate equations she loved to devise could be used to solve environmental problems.

Her award-winning thesis featuring a mathematical model of chemical spray dispersal in orchards could help horticultural growers reduce the drift of harmful droplets.

Harper developed the model using an advection-dispersion equation to predict the transport of spray droplets – containing chemicals such as hydrogen cyanamide used by kiwifruit growers – that are carried by the wind and dispersed by turbulence downwind of orchard shelterbelts.

Sharleen Harper – award-winning thesis on chemical sprays

"The orcharding industry is placing a lot of effort into addressing spray drift concerns, and shelterbelts can be very effective tools," says the student at Massey's Institute of Information and Mathematical Sciences at Albany who graduates this month.

However there is currently little information available on how to predict drift deposits downwind of the targeted area, particularly in the case of a fully sheltered orchard block, which is the focus of her research.

Her study was prompted after Massey hosted the 2005 meeting of the Mathematics-in-Industry Study Group, which representatives from Plant Protection Chemistry New Zealand and Lincoln Ventures Ltd attended for help to solve the problem of orchard spray drift. Lincoln Ventures Ltd provided additional financial support for Harper's study, which allowed her to present her work at several conferences.

Her thesis won the Cherry Prize for the best graduate student paper at the annual Australia and New Zealand Industrial and Applied Mathematics Conference in 2007, making her the second New Zealander to win the prize in its 40-year history. It is also the first thesis to be listed on the Massey University Dean's List of Exceptional Doctoral Theses established this year.

She has recently been selected, by the Royal Society of New Zealand and with funding from the Ministry of Research, Science and Technology, to join an 11-strong team attending the Joint International Symposium in China later this month for a workshop on mathematical models and climate change.

The 28-year-old former Orewa College pupil hopes her research will become available to horticulturists to better manage spraying because "sprays containing chemicals may be hazardous to human or animal health in the surrounding environment," she says.

Ms Harper has been working for the National Institute of Water and Atmospheric Research since May. Among other environmental research projects, she develops mathematical models to predict contaminant removal from city storm water, and says both her thesis and current work combine her strengths in maths and physics. ❖

Mega-deal for New Zealand science sees omega-3 technology marketed worldwide

The patented omega-3 emulsion technology developed by the Riddet Institute is to be marketed worldwide through Croda Europe Ltd, a world leader in natural based speciality chemicals and oils. Croda has more than 4000 employees in 38 countries.

Speirs Group executive chairman Nelson Speirs and Distinguished Professor Paul Moughan from the Riddet Institute taste test omega-3 muffins.

Croda will market omega-3 emulsions to food products manufacturers in the United Kingdom, Europe and North America under an agreement signed last month between Croda and Speirs Nutritionals, the joint venture set up to manufacture the emulsion, comprising the Riddet Institute, Speirs Foods, the Bio Commerce Centre and Massey University.

The principal inventor of the technology and co-director of the Riddet Institute, Professor Harjinder Singh describes the agreement as a "tremendous endorsement" of New Zealand science. "Croda searched the globe for this technology and found what they needed in New Zealand," Professor Singh says. "It is very encouraging for the Riddet Institute, a Centre of Research Excellence, as it shows that we are at the international forefront of our field."

Research, Science and Technology Minister Wayne Mapp says the institute's success in commercialising science shows the desirability of specialising. "New Zealand has to focus its science effort to get international success," Dr Mapp says.

The omega-3 technology allows the addition of significant quantities of the essential fatty acids in fish oil to foods, without a residual fishy odour or taste. The technology prevents oxidation of the fish oil and allows a longer shelf life for those products containing the emulsion. It has huge potential in the manufacture of specialised high-health functional foods.

The Massey University-led Riddet Institute is one of seven prestigious government-funded Centres of Research Excellence, and is the only new CoRE to be formed since 2003. ❖

DNA tests to trace the origin of the the Māori potato

Dr Nick Roskruge during a field trip to Ollentaytambo in the Inca Valley of the Andes last year

Fingerprint DNA of taewa, the Māori potato, will be added to the gene bank at the International Potato Centre in Lima, Peru, to increase worldwide knowledge of the taewa's journey through the Pacific.

Taewa expert Dr Nick Roskruge will travel to Lima in June to compare taewa DNA with that of other potatoes deposited there. Roskruge visited the Potato Centre and indigenous grower communities while visiting Peru last year as a guest speaker at the International Congress of Ethnobiology.

Roskruge is a senior lecturer and researcher for the University's Institute of Natural Resources and is Kaiārahi Māori (Māori adviser) to the College of Sciences. He is also the chairman of Tahuri Whenua, the national Māori vegetable growers' collective, and is involved in a range of projects and reference groups involving indigenous horticulture, vegetable production, Māori land utility and soil systems.

Fingerprint DNA is the translation of plant material DNA into written form, he says. "The fingerprint can then be compared or aligned to other fingerprints' that's how they can show their connections – or whakapapa.

During a six-week sabbatical, he will work in the potato centre's germplasm bank, where more than 3000 molecular samples of potatoes and kumara are kept, and will also visit indigenous grower communities and organisations in the Andes and in Chile.

"The origin of the potato is in the Andes and, while the link and journey between the kumara and South America is well known and proven, the story of the potato is not."

Roskruge says as well as the molecular approach using DNA samples, he will be looking at validating the connection between taewa and South America through comparisons of oral history.

"Validation using a molecular approach through DNA is fine, within the indigenous community another layer of validation comes from stories. Comparing the knowledge of indigenous communities in the Andes to Māori stories and knowledge helps increase the understanding of the relationship and journey of the potato over time."

Of Te Atiawa and Ngāti Tama descent, Roskruge has been involved in horticulture most of his life, beginning in the 1970s and 1980s in Taranaki picking gangs.

He says he was encouraged by his boss at the time to enrol at Massey in the diploma of horticulture. Since then he has attained a Bachelor of Horticulture and Technology (Hons), a Postgraduate Diploma of Māori Resource Development and last year graduated with a PhD in Soil Science.

"While I'm in the Andes a group of about 12 growers will come over and spend time with indigenous communities to talk about the link between South America and taewa. In time there is the potential to develop a reciprocal exchange to New Zealand."

His interest in taewa started about 10 years ago when he was working at a desk job at Massey's Manawatu campus. "I wanted to get out of the office and had access to a seed bank, since then taewa and the collective have taken on their own life." ❖

Career spanning 55 years recognised with commerce doctorate

Few people have worked harder or contributed more to New Zealand business than Alison Paterson.

Her curriculum vitae is "condensed" on to two pages and that is the tip of the iceberg of the achievements in her 55-year career.

She will receive an Honorary Doctorate of Commerce degree from the University at the College of Business graduation ceremony on April 21 for her long service, achievements and outstanding contribution to New Zealand business.

Testimonials supporting her nomination for the degree read like a who's who of industry and finance, including Reserve Bank governor Dr Alan Bollard, Air New Zealand chairman John Palmer, businessman and immediate past Auckland University Chancellor Hugh Fletcher, Landcorp Farming chief executive Chris Kelly and retired PriceWaterhouse partner Jeremy Rickman.

Paterson's roles range across health, agriculture and infrastructure. She is currently chairman of the Abano Healthcare Group, the Governing Board of the Centre of Research Excellence for Growth and Development (University of Auckland), the deputy chairman of the Reserve Bank and a board member of Nga Pae o Te Maramatanga (National Institute of Research Excellence for Maori Development and Advancement). She has been a member of the Massey University Council since 2004 and chairs its audit and risk committee.

Her other directorships include Vector and Metrowater. In recent years she has chaired Landcorp Farming Ltd, Waitemata District Health Board, the Electricity and Gas Complaints Commission and was a councillor of Barnardos.

In 1976, she was the first woman appointed to a producer board when she was invited on to the Apple and Pear Marketing Board and, two years later, was the first woman director of a publicly-listed New Zealand company, McKenzies Ltd.

She has never considered that gender matters. "I try to be my own harshest critic, to add value and I have always found men to be supportive to women directors," she says.

Growing up in King Country, Paterson (nee Glennie) took inspiration from her mother and grandmother – both housemaids. "They were both wonderful women who worked hard," she says. "I think I have their service ethic in my genes."

She boarded at New Plymouth Girls' High School, at great financial sacrifice to her mother. In her final year she developed a hereditary deafness, which she now reflects may have set in train her career in business.

"I was unable to pass my medicals to go into the traditional women's professions of teaching or dental nursing," she says. "I – and those professions – were probably lucky."

Instead she learned shorthand and typing and took a job with a Taumarunui accountancy firm. The deafness was reversed with surgery and she qualified in professional accounting by correspondence, while working full-time.

In 1970 she became a partner in Seath Aston and Dinsdale, then set up her own practice a year later, specialising in farm accounting. She became widely known in the agriculture sector and was closely involved in the establishment of deer faming in the 1970s.

She has worked with prominent iwi leadership and, coming from the King Country, has always had considerable interaction with Māori.

Paterson says she is thrilled to receive an honorary doctorate from Massey. "I don't have an alma mater and Massey University reflects me perfectly. I have a background in agriculture and the distance-learning programme fits well with where I have come from. Distance learning at Massey offers opportunities for people who are not otherwise able to access tertiary education.

"I am very committed to what I do. If at the end of a working lifetime you do not have the respect of your peers then you've achieved nothing – so for me this is that recognition and it means a lot." ❖

Markets flock to new device for stock management

Hours spent immersed in crowded, dusty stockyards are paying off for industrial design Professor Tony Parker and electric fence manufacturer Gallagher.

Parker and the landmark Kiwi company have joined forces to develop a portable hand-held device that is changing the stockyard work routine.

The Smart Reader is designed to allow farm workers to automatically identify individual animals by a unique electronic number attached to them in the form of a tag or bolus.

In the year since its launch it has enjoyed strong market interest from many countries.

Gallagher's marketing manager Mark Harris, says the device forms an important part of the emerging trend towards improved individual animal performance monitoring and management on farms. Radio Frequency Identification for livestock is an enabling technology that allows monitoring and recording of livestock performance (weight gain or milk production) at very low cost. This provides the information for better decision-making around feeding, buying and selling livestock.

The technology also forms a part of livestock traceability schemes that many countries are now applying as part of food safety and authenticity requirements. It's a process otherwise known in the sector as "from pasture to plate" traceability. This serves the dual purpose of allowing farmers to follow the path of their stock, and food markets to know where their end product comes from, providing significant marketing opportunities.

In addition, from a worst-biosecurity perspective it also allows the speedy identification of specific livestock and animals they have been in potential contact with.

"If you do that quickly , the impact of a disease outbreak can be contained more efficiently," Mr Harris says. These two factors are the driver behind the schemes that have been adopted in Australia and Canada.

Harris likens the reader to a next generation supermarket bar code reader which overcomes issues of dirt and readability of tags in the farm environment.

By waving the wand containing an antenna over the tag or bolus the livestock number is recorded. Once the reader receives the number it either stores it in its memory or sends it to another storage device such as a smart scale or computer.

Parker says as well as providing for the transfer of individual animal information for livestock inventory management its benefits included its convenience with an ability to be portable in field collection.

It is also fully integrated with other electronic devices such as weigh scales, automatic drafting units and compatible databases, as well as providing accurate record keeping for breeding and monitoring animal health risks.

Parker who was the industrial designer on the project, supported by Gallagher's product development team, says the smart reader's features include an ergonomic pistol grip and an integrated finger shield to reduce the likelihood of injury when working in confined spaces with unpredictable animals.

"Stock yards are often noisy and dark environments so you can't always hear the feedback it's equipped with a loud beeper and vibrating handle," he says.

Overall form, part, lines and configuration has been designed to enhance the unit's robustness, water resistance, ease of manufacture and promotion of a strong product brand.

How it looked was also intended to showcase a high value, robust professional electronic agricultural tool that would fit appropriately within the farm environment, Parker said.

One of his former Master of Design graduate students, Matt McKinley, now works for Gallagher's. ❖

Professor Grant Guilford

Prosperity through agri-food innovation

The prosperity of New Zealand's urban and rural communities is closely tied to innovation and productivity in the nation's agri-food sector.

Optimal innovation requires comprehensive support of the agri-food value chain and the vast array of other sectors with which agri-business is inter-twined. The support must cover all the contributing disciplines and include fundamental research, applied research, education and continuing professional development.

For this reason, Massey University, like all leading agri-food universities world-wide, has worked diligently to expand its expertise in areas as diverse as fundamental science, agricultural science, environmental sustainability, animal welfare, biosecurity, food technology, process engineering, human nutrition, food safety, human "wellness", information technology, supply chain management, design, finance, marketing, trade policy, Maori economic development, and the social sciences as they relate to rural communities and the culture and languages of our trading partners.

> "Agri-commerce graduates need to have skills relevant to the management of agri-businesses throughout the value chain with a strong understanding of what it takes to be competitive in global markets."
> - Professor Grant Guilford

Similarly, we have worked to ensure our graduates are equipped with the diverse range of skills required by those in the agri-food sector. For instance, modern farm managers now need to understand environmental management, human resource management and advanced technologies in addition to traditional agricultural science. Agricultural scientists require grounding in fields as diverse as molecular biology and nanotechnology. Food technologists must be equipped to be the leading change agents in the development of New Zealand's food, processing and manufacturing industries. Veterinarians must be globally accredited to minimise risks to trade from compromised animal welfare, biosecurity and food safety. Agricommerce graduates need to have skills relevant to the management of agribusinesses throughout the value chain with a strong understanding of what it takes to be competitive in global markets.

To enhance the accessibility and quality of our undergraduate, postgraduate and professional development programmes we have developed an advanced e-learning infrastructure and the resources and knowledge to facilitate the learning of dispersed rural professionals at a time and place of their choosing. Our international networks include strong linkages with the best agri-food universities in Asia, Australia, Europe and North America through which we can tap into a vast array of complementary expertise.

For these reasons, Massey University is recognised internationally as a global leader in the agri-food sector and is ideally positioned to provide the comprehensive support required by an innovative, sustainable, market-savvy, agri-food value chain. We intend to extend this leadership over the ensuing decades and look forward to partnering with New Zealand agricultural and food businesses to help this country define what it is to be a global innovator in the agri-food sector. ❖

Grant Guilford is chairman of the Massey University agri-food strategy executive, a member of the Massey Agriculture Board, and has been responsible for developing the University's agri-food strategy. A Professor of the College of Sciences, Professor Guilford was Head of the Institute of Veterinary Animal and Biomedical Sciences for 11 years and is now establishing a new Institute of Natural Sciences at the University's Albany Campus.

Rating the best beef

Professor Steve Morris with Rebecca Hickson

Improving returns from New Zealand beef has seen PhD student and lecturer Rebecca Hickson travel the length of Massey's 474ha Tuapaka farm more times than she cares to recall. From daytime visits to observe the cows in the paddock atop the Tararua Range, to eight-hour shifts providing a 24-hour monitoring and assessment of each of the cows as they laboured, her job to identify the most effective calvers.

Intensively monitoring the Angus herd was a labour of love, Hickson says.

"We watched every one give birth," she says. "Recordings included how long it took, time at each stage, birth time and weight. We watched about 65 give birth the first year and 80 the following."

Calves were followed and intensively tracked, the measure of efficiency used the weight of the calf at weaning divided by the liveweight of the cow.

The Massey team, funded by Meat and Wool NZ and led by Professor Steve Morris, also questioned when heifers were best calved.

"It was more profitable to calve heifers at two instead of three years of age," Hickson says. "Rate of assistance at calving increased with birthweight of the calf and decreasing live weight of heifers but wasn't affected by body dimensions."

Industry surveys had revealed that a difficult birth was implicated in half of the calf deaths between birth and marking, so Hickson's research can be used to minimise those losses by selecting cow and sire size to contribute to ease of calving.

Some progeny will be used for another beef cattle experiment now under way, as Massey assists Meat and Wool NZ to find the most efficient beef cow.

Though farm numbers are stable at around 25,000, beef cattle numbers are dropping, Morris says, with about 4.5 million beef cattle and 1.1 million breeding cows.

"Farmers are increasingly looking to beef breed cross dairy heifers as replacements for breeding cows," Morris says. "So this experiment compares cows of different types to find the most efficient. Dairy and dairy cross-breed are expected to have increased milk yield and therefore wean heavier cows than the base Angus breed."

With tightening economic conditions, the emphasis is on maximising return to farmers.

"Cow maintenance costs are a large proportion of the costs of keeping a beef cow," Morris says. "For farmers with a 200-cow herd, a 10 per cent improvement in feed efficiency would generate an extra $3350 in net farm income."

The new trial will include some Angus heifers from Hickson's original experiments evaluated over three breedings and two calvings, with Angus-Friesian, Angus-Jersey and Angus-Friesian-Jersey, pure Friesian and pure Jersey cows also evaluated.

"The bottom line is what is the more efficient cow on hill country," Ms Hickson says. "Is a great big cow and a bigger calf best – or a small cow and a smaller calf?" ❖

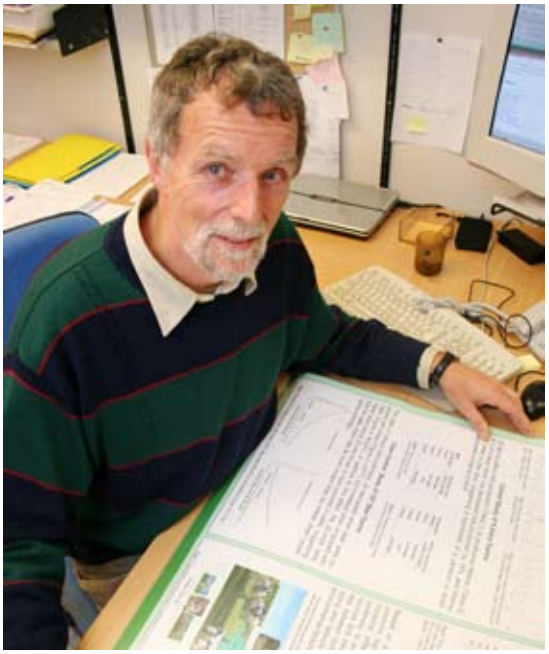
"Cow maintenance costs are a large proportion of the costs of keeping a beef cow," Professor Morris says. "For farmers with a 200-cow herd, a 10 per cent improvement in feed efficiency would generate an extra $3350 in net farm income."
- Professor Steve Morris

Managing disease risks

The death of a meatworker from leptospirosis in 2007 led to a renewed interest in the disease, which affects farm stock but can be contracted by people who come into contact with them. Now Massey researchers are investigating other groups that may be at risk.

Leptospirosis is the nation's most common occupationally-acquired disease and Massey University researchers are leading the way in research into its control.

Associate Professor Cord Heuer, from the University's Epicentre, is leading the research. The Epicentre is part of the Institute of Veterinary, Animal and Biomedical Sciences. It offers expertise in the understanding and control of disease in animal populations, the transmission of disease from animals to humans and hazards in urine-contaminated environments.



Associate Professor Cord Heuer

"Last year we did a study of meatworkers and found that 10 per cent of them tested positive," Heuer says. "That showed there was a real risk from sheep of shedding bugs that also go into people."

There is a strong relationship between animals as a reservoir or source of infection and the disease in people. Meatworkers are in contact with the bacteria in kidneys of up to 25 carcasses on an average working day. Heuer says his team will now widen the scope of the research to include other at-risk groups.

"At the moment we are asking: if meat workers are at risk, who else is? Farmers and other workers in the animal industry such as truck drivers, but also veterinarians are likely to be at risk," he says. "Every year vets do thousands of pregnancy diagnoses so they are close to the source. So that's the task ahead of us. This year we'll start screening a larger group of farmers and test farm workers and families. Next year we'll also go to veterinary conferences and ask for blood samples."

Heuer says leptospirosis often goes undiagnosed. "The disease can go from almost no symptoms at all to being hospitalised; people can lose kidneys, or even die," he says. "It is characterised by flu-like symptoms. But it doesn't have the respiratory symptoms and there is almost never a sample taken, so it is usually not diagnosed."

Even so, the number of notified cases has doubled in the past year, from 65 to 110. President of Rural Women New Zealand Margaret Chapman says anecdotally rates are much higher.

"Everybody knows someone who has had it in the farming community, if not had a family member affected," she says. "It's often not picked up by doctors and it is very debilitating."

Her organisation has raised over $100,000 in the past year that has gone towards Massey's research. "Members have really taken the issue to heart. It's an illness of the rural community and we really want to see some progress."

Heuer says more work is needed to find the infection sources so recommendations can be made to target them.

"Vaccination of animals is the only real effective means of reducing the amount of disease in the environment," he says. "Someone needs to pay for it so it is dependent on the economics. In seriously infected deer herds, Massey's Professor Peter Wilson found vaccination can actually increase growth rates, so it has an economic return for farmers. We're now going to look at sheep and beef to see if the same is true."

At present, ACC only recognises meatworkers as being at risk of contracting leptospirosis at work.

"If we are able to make a case and say if a farmer gets infected there's a high probability it's from his animals, then that may have an impact there. It would help because more testing and more targeted treatment would be done, followed by more awareness about vaccinating livestock, so that's the only way you can have an impact in the public health sector." ❖

definingnz

Massey University

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Graduation 2009 begins with Albany ceremonies at the Bruce Mason Centre in Takapuna.

Graduation is one of the most important celebrations of the university year.

Albany Campus students, staff and Alumni will be attending ceremonies to congratulate graduates on their successes, alongside their families and friends.

Six ceremonies will see graduates awarded their qualifications, followed by ceremonies to honour Māori and Pasifika graduates. The ceremony to honour Pasifika graduates will be the tenth held at the Albany campus.

7PM: 2009 Professorial Lecture Series, Albany Ccampus, Sir Neil Waters Lecture Theatres, NW200
Professor Kerry Chamberlain
A pill for every ill? The social meanings of medications in society today

Medications are ubiquitous in society today. They occur in multiple forms, are widely promoted, and routinely consumed. This lecture will consider how this has arisen, examining the involvement of changing understandings of health, new ways of consuming health, and the medicalisation and pharmaceuticalisation of everyday life. Medications have social lives as well as pharmacological lives, being both material and symbolic. We will examine the complexity of medications as social objects, their symbolic meanings and uses, and the identities and social relationships bounded by them.

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Manawatu graduation ceremonies commence at the Regent on Broadway Theatre in Palmerston North.

A ceremony to honour Pasifika graduates will be held in Palmerston North for the first time.

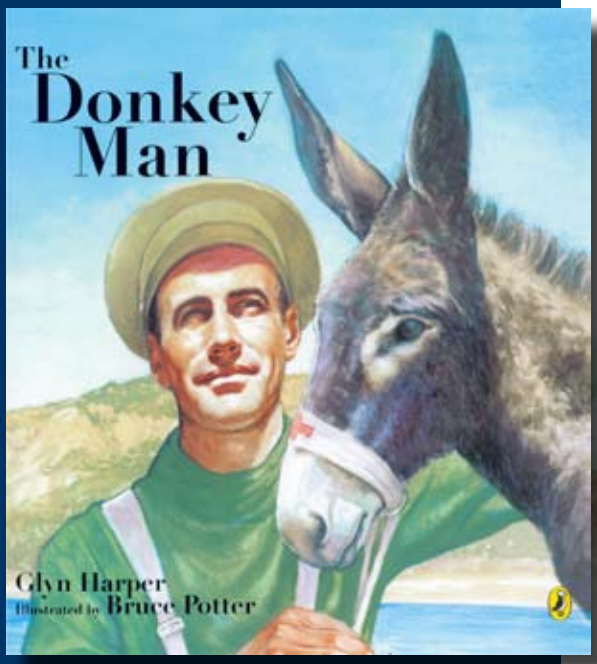
The College of Business is presenting a series of free lunchtime seminars to celebrate the bi-centenary of composer Franz Joseph Haydn. This series will explore beyond the music into areas of leadership practice and the place of artistry in New Zealand's social fabric. Each seminar will run from noon to 1.30pm. Book a place by emailing j.clewett@massey.ac.nz or call 09-414-0800 ext 9553

May 6 – Leading historian and social commentator Associate Professor Peter Lineham presents The Influence of the European Enlightenment on New Zealand Life and Culture. Music by the NZ Trio

May 13 – Professor Brad Jackson will discuss Contemporary Leadership Practice Drawing on Lessons from Haydn's Europe. Music by the NZ String Quartet

May 20 – Dr Allan Badley presents a seminar titled The Diplomacy of Art: Haydn in 1761. Music by Richard Mapp and the NZ School of Music orchestra

May 27 – Dr Jenny Lawn explores New Zealand cultural identity focusing on the role of the arts and will discuss Artists in New Zealand Society. Music by the NZ Trio



Research for a new audience

It is not the most renowned genre for academic research into military history but *The Donkey Man*, a children's book written by military historian Professor Glyn Harper, is reaching a vast new audience.

Harper says he wanted to prove his research was not just aimed at the academic community.

"I wanted to reach a wider audience," he says. "These children's books are now held in most schools in the country. They're giving young people an introduction to New Zealand's military heritage, and I'm helping to show that academia isn't divorced from everyday society."

While his stories are written in a manner school children can understand, they are historically correct and *The Donkey Man* is based on a real soldier.

Richard Alexander Henderson, from Grey Lynn in Auckland, joined the medical corps in 1914 and was part of a group that used donkeys to carry sick soldiers at Gallipoli.

The book tells his story, but from the point of view of a donkey. "Children relate strongly to animals, so I thought that narrative device would work well in this genre," Harper says.

The ploy seems to have worked, with publisher Puffin informing him last month that another 1500 copies of the book – its third print – have been ordered.

Harper also worked closely with the book's illustrator, Bruce Potter, to ensure the pictures were accurate.

"The landscapes, uniforms, vehicles and machinery all need to be correct," he says. "Now, publishers have used me to oversee any books they may be working on with a military connection, to make sure they're also accurate."

Harper wrote his first children's book, *Mission to East Timor*, seven years ago. As the official Defence Force historian for New Zealand's involvement in East Timor, he chronicled the nation's involvement there, and his publisher suggested a book aimed at a younger audience.

He has now published six children's books, with a seventh, *Le Quesnoy – The Town New Zealand Saved*, to be released early next year.