NZ GRASSLAND ASSOCIATION
Fuelled by Science, Tempered by Experience

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President's comments

Graham Kerr

Isn't it great to meet motivated young people in our industry.

I say this after visiting a Canterbury dairy farm the other day, as it was such a positive contrast to listening to the radio about how the pastoral industry is to blame for all our environmental woes. I am old enough to remember when the role of the media was to inform. Unfortunately those times are gone.

We visited a couple, around 30 years of age, who managed 800 cows for a corporate company, with a goal of feeding cows ≥95% pasture through the milking season. They explained that this figure came from consumers, who wanted milk produced from pasture in an "environmentally good" way.

The international visitors we were hosting asked "what if you can't feed pasture?" And the couple talked about how they did keep them on the feed pad at times, and this was all recorded. They had to have systems that their dairy company could audit.

What impressed me most was not their good pasture management, their desire to look after the soils, their extensive native planting around the cowshed or even their focus on continually improving the environmental footprint of the farm.

What impressed me was the attitude of this young couple.

They lived, believed and recorded the range of information needed to measure their environmental goals, and they understood the importance of their link through to the end consumer - who at the end of the day we need to pay for the increased costs around sustainability and compliance our industry will incur.

While the agenda of our mainstream media is now to sensationalise and inflame, all through a superficial soundbite or two, how nice it was to be on a farm where they are simply getting on with making the changes we need to make. Unfortunately good news is rarely covered by the mainstream media, but that does not mean it doesn't exist! It is people that make the difference, and will make the future we need to have.

Napier Conference Update

Napier Conference

Registrations for conference are Now Open online.

ONE day registration - You can register for One day but only as a single day therefore either Tuesday or Wednesday but not both. Do not be offended if the administrators remind you at registration.

Member rates- If you do not get a members rate option online it may mean your details (email) are incorrect in our system. Please let us know at **finance.nzga@gmail.com.** We usually catch these and refund your credit card if you overpay in error.

Membership and earlybird rate - to qualify for the members rate your subs must be up to date therefore we will remind you and ask for payment. Please note that earlybird registration **must be paid,** not just invoiced before 30th September.

Check out the Draft conference programme here or download the Registration form (pdf) here

Student Travel Awards

Once again NZGA is offering Student Travel Awards for attendance to this years annual conference in Napier.

The funds are allocated each year by the Association to support student participation at the conference and include accommodation and travel support as well as covering the cost of registration and conference dinner.

The Application forms are available online here.

Applications are due to the Executive Officer on 6th Oct 19.

More than number-8 wire

Jacqueline Rowarth, Past President of NZGA

Want to be more innovative? Improve your life? Reveal your creativity? Try thinking differently…

In June this year, the Management Tip of the Day from Harvard Business Review urged readers to 'break out of your standard patterns of thinking'.

Professor Adam Brandenburger, Stern School of Business at New York University, suggested that we can push ourselves to be more creative by trying out new approaches to challenges.

Sounds like what farmers do all the time.

Of course, sometimes it is more of the Number-8-Wire-make-do than the disruptive innovation of Facebook or Instagram…. but given that the unintended consequences of social media have been considerable, disruptive should not be considered the same as good.

Innovation that changes peoples' lives for the better (which doesn't describe social media in all cases) is 'fit-for-purpose'. And that means understanding the context of 'the purpose'.

The people who best understand the agricultural problems are the people who are working on and with the land. In 2013, a Grassland conference paper (available on the www.grassland.org website) written by farmer Warwick Lissaman, technology transfer expert Marie Casey, and a soil scientist (me), stated that:

'the belief that the average farmer in New Zealand is too old to adopt new technologies overlooks the evidence, and the overseas literature aligning adoption with education, experience and financial security. It also overlooks the fact that many innovations are developed on farm by people experienced in what they are doing'.

The Lissaman *et al*. paper built on Past President Pat Garden's Levy Oration (2012), in which he reminded delegates that end-user innovation is by far more the most important and significant source of innovation.

This year the winner of the International Innovation Award at the National Field Days (Mystery Creek) was the Gallagher Water Flow Indicator. The inventor was Gisborne farmer Murray Tones…. stimulated by his wife telling him that it was time to stop complaining about time wasted on searching for water leaks and get on with finding a solution.

Murray says that it took him several years to come up with a prototype that was sufficiently robust for him to approach Gallagher. By the time the indicator reached the competition it was a thing of beauty – simple, easily fitted in current water systems and with potential for WIFI connectivity to alert users to problems. (NB I had the privilege of being a judge for the innovation awards, and felt that the flow meter also had potential to be of assistance to anybody who had concerns about water usage… parents of teenagers came to mind…)

The overall winner was FuturePost, a company making strong fenceposts from commercial and domestic plastic waste – plastic bags as well as milk bottles. Founder and General Manager Jerome Wenzick has been farming (dairy and drystock) for over 20 years. He has worked with another farmer, Bindi Ground, who had experience in recycling and repurposing.

At the Federated Farmers Awards, the Science and Innovation category was won by Cleartech - a system for reducing the nutrient concentration in dairy shed effluent. Cleartech was also highly commended in the Innovation Awards at National Field Day. Cleartech is a development between Lincoln University soil scientists and Ravensdown. Professors Di Hong Ji and Keith Cameron aren't farmers, but they have spent their lives working with farmers and industry, as well as teaching the next generation about the basics of soil science, and how to approach problems and find solutions.

It is this interaction between people with different backgrounds and experiences that has kept the New Zealand primary sector both innovative and agile – reacting to the needs of society as well as farmers.

It has also made the agricultural sector productive.

StatisticsNZ data released earlier this year showed that multifactor productivity in agriculture from 2008-2018 averaged 2.8% a year. In contrast, accommodation and food averaged 1% a year. IT and telecommunications increased at 2.2% a year and wood products by 2.4%. Agriculture multi-factor productivity was exceeded only by retail at 3%... which is underpinned by exports bringing new money into the country, and so depends at least in part on the productivity of agriculture.

In the UK, where only a quarter of farms actually make money from farming, alarms about productivity have been sounded. Last month, Defra's Deputy Director, Tim Mordan, stated that UK productivity had stagnated and that 'agriculture is three times less efficient than other sectors of the UK economy'.

Technology is being proposed as the solution for UK farmers, particularly in their staple crops (cereals and canola). Key questions being asked are:

what are consumers going to demand in years to come?

what are they going to be eating?

how are we going to produce it?

and how are we going to do that against the UK government targets of net zero carbon emissions by 2050?

These questions have been asked in New Zealand for some time, and brief answers can be summarised as follows – more but cheaper, whatever they think they deserve, as sustainably as possible, and the jury is out….

The UK, however, is suggesting more.

A new generation of hybrid biologist-engineers has been proposed – a cohort of physical engineering graduates who also have adequate familiarity with biological concepts and agronomy. Likewise, a cohort of biology graduates trained to have an appreciation of the possibilities offered by

relevant elements of engineering and AI is needed. And the UK has stated that to achieve what is needed requires a change in investment, professional education and regulatory or policy constraints.

New Zealand farming and science leaders have said similar things that in the past – but perhaps now that another country is saying it, people will listen and take action. And being a small country, we should be able to be agile and get there sooner.

Table 1. Classic economic sources of entrepreneurial opportunities

Source of entrepreneurial opportunity	*Definition*
Change in demand	Any change in customer's demand provides entrepreneurial opportunity if entrepreneurs are able to cater to this demand
Change in supply	Changes in supply provide entrepreneurial opportunity by enabling entrepreneurs to rearrange the value chain
Information asymmetries	Reduction and/or creation of information asymmetries between supply and demand provide entrepreneurial opportunity
Exogenous shocks	Exogenous shocks such as new regulations or new technological solutions provide entrepreneurial opportunity by altering the mechanisms and/or frameworks of existing markets

Table 2. Five steps of the food value chain

Step	*Definition*
Agriculture	All activities and inputs required to cultivate crops and livestock
Transforming	Processing crops and livestock into food ingredients
Converting and Packaging	Composition of food products out of different ingredients and the transportation ready packaging of the same
Shipping and Selling	Transportation, stocking and promotion of food to make it available for purchase
Consuming	Preparation of meals and provision of the same e.g. in a restaurant or home

Entrepreneurship and entrepreneurial opportunities in the food value chain - Kuckertz, Hinderer and Röhm, March 2019 NPJ Science of Food

Research has shown that there are many places along the value chain where innovation is possible (see Table), but unless we have people in the primary sector who understand the production systems from 'soil to saliva' we will miss opportunities to be innovative and make a difference.

In his Harvard Business Review article, Professor Brandenburger stated that great innovators see the world differently.

New Zealanders always have – and now, more than ever, their knowledge and experience is needed to develop innovative approaches to meet new production challenges. Lissaman *et al*. (2013) suggested that these new production challenges might be environmental, economic or regulatory. The reality is that the current challenges involve all three.

And that's why it is imperative to be encouraging good people into the primary sector – people who are prepared to engage with the biology of production and the physics and chemistry of technology.

New Zealand's competitive advantage is likely to continue to be everything we can do with food and fibre production. Whether the impetus for innovation is provided by your partner or your own rethinking…. or your children… you can make a difference. That difference might not end up in a competition, but it will help keep New Zealand at the forefront of productivity, to the envy of other countries like UK.

But perhaps the biggest difference we can make in the short term is to explain to people in policy and politics why we do what we do, what contribution we make, and what New Zealand would be like without our productivity.

And with apologies to various marketers – let's do it…

The wicked problem of livestock wintering

Dr David Stevens, AgResearch

Wicked problems are an increasing feature of human existence on Planet Earth. A wicked problem is one that looks simple on the outside but finding a solution may unravel the very fabric of your existence. Wintering our livestock on forages is a wicked problem for our livestock farming.

The solution to wintering on forages is to stop doing it, right? So, a simple solution. As H.L. Mencken said, 'there is always a well-known solution to every human problem – neat, plausible and wrong'. Why would the solution be wrong? Because it is a complex problem that can only be solved by applying deep thought using clear science.

What makes it a complex problem? Surely the cows just need to go somewhere else and get fed something else. Immediately we have now defined two new parameters that need to be examined. Where is somewhere else? Is it onto a pasture, onto a stand-off pad or into a barn? Or maybe it is another location altogether? Now we have split this one parameter into four.

What type of feed is something else? Is it pasture, silage, palm kernel expeller, or something else altogether? Again, we have many options, all with specific qualities that need to be examined to test their ability to fulfil the need.

Interestingly, we haven't clearly defined the problem we are trying to solve yet. What is the problem with wintering on forage crops? Is it the comfort of the cow, the damage to the soil, the impact on the environment or meeting the nutritional needs of the cow? Now we have four outcomes we are trying to meet.

So, four somewhere, with four something's, trying to answer four outcomes. And all of these have many more features, both positive and negative. We have rapidly got to a minimum of 64 answers, and none of which will provide an optimum outcome suitable to all.

As we develop the case for change, we see that we have to examine each component, and then test for interactions between the components. Let us develop a scenario. We choose to put the cows on a feed pad and feed them palm kernel expeller. First, why would we do that? A feed pad is the option with the lowest capital cost that will get cows off soils (solve the soil damage outcome), and palm kernel expeller is the cheapest feed (replace the forage crop at a near cost-neutral basis). So, what are the impacts of this choice? A feed pad will leach nutrients if poorly constructed, so environmental outcomes may not be met. It will get saturated (unless under cover) and so will emit nitrous oxide, a very potent greenhouse gas. If it is outdoors the cows will still get wet and cold, have to lie in their own waste, and may have to also suffer high ammonia gas levels. At the end of winter there will be waste to clean up and dispose of. The palm kernel expeller is a by-product of another industry, so helps with our Circular economy goals. It is imported, so is a significant biosecurity risk. It is seen as a product of deforestation and habitat destruction so is a threat to our premium product status. It is not quite balanced as a nutritional option, so the cow's nutritional needs are not met.

The outcomes that may develop here highlight the substitution of one impact for another. One environmental impact (sediment loss) gets replaced by another (ammonia/ nitrous oxide loss). One animal welfare impact (muddy cows) gets replaced by another (ammonia/cold wet cows). One social impact (outrage at the treatment of cows) gets replaced by another (outrage at deforestation and habitat loss). So the first of our 64 options doesn't work so well!

How about we put them on pasture. After all, cows are made for eating grass. That way the somewhere is a place we already own, the paddock, and the something is grass, which we already grow. In the southern regions of New Zealand, the amount of grass grown in winter much less than the amount needed to feed the cow. As a result, we have to fill the gap between supply and demand somehow. We can accumulate some pasture in the autumn, stockpiling it for feeding in winter. Now we are starting to add extra factors into the solution, making it more complex. Let us follow the idea that we can stockpile enough feed in autumn. To do this we need to either dry our cows off early or reduce our stocking rate. Both options add further complexity as this will impact on the production on the farm.

Who really cares about a farmer reducing his production? Well, everyone around him. If his productivity drops (along with the others taking this approach) then the number of workers in the transport and processing of his product are reduced. The people supplying him with the services such as seed, fertiliser and farm supplies are impacted. The people in the community may be impacted (by both the number of workers and the number of partners and children) and so the services are impacted.

This solution of reducing productivity also highlights flow-on effects out into the community. Interestingly, some more expensive solutions provide more support within a community. For example, high input dairy farming is often no more profitable than low input dairy farming, for the individual farmer, but provides many benefits to associated businesses, and so to communities at large.

These few examples demonstrate the interactions that need consideration when providing answers to wicked problems. The farm system is a finely balanced match of feed supply on the one hand and animal demand on the other. The farming system, when many farms are placed in the community and the supply chain, and its contribution to regional New Zealand, is much more complex. Wintering of livestock on forage crops has evolved as an answer to the wicked problem. It exists because it is currently the answer that is most effective and has least impact at the farming systems level. It is effective because it delivers to economic, social and societal needs, while having a containable environmental impact.

The wicked problem has a current solution. However, the needs and expectations of society are constantly changing. Therefore, future solutions are needed. The transition to these unknown solutions needs to consider a whole of systems approach to ensure that one sacrifice is not replaced by another.

Travel Award available to The Joint XXIV IGC and XI IRC congress to be held in Nairobi, Kenya 25-30 Oct 2020

The NZ Grassland Association, the NZ Grassland Trust and the T.R. Ellett Agricultural Research Trust will award six $4,000 travel grants to assist with registration and travel costs to Kenya in 2020. These grants are available to farmers, researchers or agribusiness people involved in the New Zealand pastoral industry who have either been working for less than 10 years, or last graduated from University less than 10 years ago. The aim is to help develop the careers and work networks of young agricultural professionals. *Download the application*

For more information on the conference click this link

Changing winter feeding practices for good

David Stevens, John Scandrett and Marie Casey

Winter can be a tough time for animals grazing outdoors. Recent research in Southland has highlighted opportunities for our sheep farmers to improve the lot of our sheep, while reducing their environmental foot print.

Feed is often rationed to sheep over the winter, to make sure that that feed supply and animal demand are carefully met, and the feed doesn't run out before the grass grows in spring. Systems developed in the 1970's dictated that to maximise the efficiency of this approach sheep should be allocated fresh pasture each day.

Recent research has challenged this approach. The challenge has been driven by the changing needs of our livestock, and the changing expectations of society. Back in the 1970's stocking rate and wool production were highly important in farm profitability. Now, per head performance and much higher lambing percentages drive profitability.

This means that we need to fully feed our sheep during winter, to maintain ewe condition and maximise lamb survival and welfare. This opens the door for new grazing management options.

The new approach is as simple as changing the rationing programme from a daily ration of feed to providing 4 days worth of feed at once. This means that the overall amount of feed allocated doesn't change, just how often it is provided.

Simply put, it means that instead of offering the sheep enough to eat for a day, the farmer offers four times the area, and only shifts them once every 4 days.

The benefits that have been measured at farm scale at quite startling. The lower stock pressure changes the behaviour of the sheep to be less competitive and do less damage to both the pasture and the soil. Therefore the pasture recovers faster, the sheep gets to eat more of the grass offered to it, and there is less soil damage and potential soil loss. These benefits were found across a study involving 15,000 ewes in Southland.

Associated benefits mean that pastures also recover faster in spring, improving ewe nutrition then as well.

Because the sheep are only being shifted once every 4 days, this lowers the labour and fencing requirement per mob. Farmers have been using the extra time to manage more mobs, improving their precision of feed management. Farmers have also noticed an improvement in stock health.

While wintering systems are a wicked problem, the 4-day grazing solution appears to be simple. However, there are hooks. There has to be enough feed to satisfy demand. If there isn't then the sheep will become more active and begin to damage the pasture and soil again. This provides the farmers with the opportunity to monitor the adequacy of his winter feed rationing and allows for constant adjustment and improvement of practices. This doesn't necessarily change our requirements for winter crop, as this depends on whole farm feed budgets and stocking rates.

For more information on the Sustainable Farming Fund project

Pasture damage after a single day grazing

Compared to pasture condition post a 4 day grazing period

4 day shifting resources

Winter feeding ewes

Ewe winter grazing management

Further resources on Winter grazing management

Beef+Lamb NZ

winter grazing resources

DairyNZ

Wintering on Crop and Pasture

Environmental considerations and winter grazing