



Grassland News

"Fuelled by science and tempered by experience"

View from the Coast

Anders Crofoot

Greetings from the coast I have just come back from the NZX Agribusiness Conference in Taupo. This is an excellent agricultural conference and the organisers are clearly taking pointers from NZGA Annual Conferences! They used the same venue and had a very similar session around nitrogen leaching as we did three years ago. Of course, looking for the best speakers, they chose NZGA member Stewart Ledgard and the same farmer who addressed our conference, Mike Barton. The Emissions Trading Scheme (ETS) was also discussed. These two topics really highlighted the demands being placed on agriculture, the role of science in helping to address those demands and some policy conflicts that will be very difficult to resolve.

Stewart Ledgard spoke to the delegates about the results of the research that has taken place around the issues of nitrogen enrichment in Lake Taupo. To try and halt eutrophication of the lake, the Waikato Regional Council has placed a nitrogen cap on the farmers in the catchment. Mike Barton talked about the process the farmers have been through and how they are going to move forward. Farmers need to make continual productivity gains to keep ahead of increased costs or their businesses won't survive (the price for beef that a farmer receives has not increased in the past 20 years according to the Meat & Wool Economic Service). However, these gains can not come with the adverse

environmental impact of increased nitrogen leaching. Farmers hold great hope that the research being done by our science community will come up with solutions.

On a national level, the NZ Government has responded to our Kyoto commitments with an all sectors all gases ETS. There are increasing efforts being put into research to reduce agricultural emissions. One promising avenue is to change what we feed our ruminants thereby reducing their damaging emissions. Now here is the rub. Research in the Taupo area is showing that the process of regrassing pastures results in significant N leaching. So while a new pasture species may be beneficial in reducing ruminant emissions, will farmers be able to introduce the new species if their establishment is potentially harming water quality? Maybe we need to find new ways to establish pastures?

A holistic view must be taken. Policy developed in isolation leads to contradictory demands being placed on the farmer. If the farmer can't see an obvious way forward, they are most likely going to continue what they have been doing, which will not lead to any change in outcomes. Farmers will adopt new technology very quickly when there are obvious benefits (quad bikes would be an example). We need to look at whole farm systems so that gains in one area don't come at the cost of another. If there is a clearly identifiable economic advantage then great progress will be made.

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7th International Symposium on Fungal Endophytes of Grasses

Lexington, Kentucky, June 28-July 1, 2010 (www.ca.uky.edu/msaisfeg/)

The NZGA executive was delighted to receive applications for travel support to the above conference and this has been awarded to the following people: - Grant Rennie; Sarah Finch; Wayne Simpson; Stuart Card (all from AgResearch) Richard George (Cropmark) and Courtney Inch (Agriseeds)

Conference 2010 Update

Farmer Agribusiness Workshops

Jeff Morton, Ballance Agri-nutrients, Convenor

Conference planning is well underway and a draft programme outline is available (<http://www.grassland.org.nz/>). A new feature of this years conference is the Farmer Agribusiness workshops. These will be held on the Tuesday and Wednesday morning and each workshop session will run for 50 minutes and be repeated so attendees can choose which two sessions to attend each morning.

In farming, there are questions that are repeatedly asked without necessarily getting a good answer. The workshop programme is an attempt to provide answers. Each will have a facilitator to ensure that there is plenty of interactive discussion as well as a consultant or scientist who has a high level of expertise in the topic and are good communicators. The target audience are the farmers, industry reps and others who want a break from scientific presentations.

The workshops have been deliberately placed prior to each field day so that some of the issues covered or introduced will also be part of the field day.

Draft Workshop Programme

Tuesday 16 Nov 10:30am-12:30pm

- *How to optimise water and N into a cropping operation?* Nick Poole (FAR) and Hamish Brown (Plant & Food)
- *High efficiency of nutrient use will reduce losses to the environment* Warwick Catto (Balance Agri-nutrients) and Ants Roberts (Ravensdown)
- *Better performance from feeding forage brassicas and beets* Jonathon Davis (Farm Consultant) and Glen Judson (Agricom)
- *Identification of insect pests in pastures and crops* Trevor Jackson and Richard Townshend (AgResearch)

Wednesday 17 Nov 10:30am-12:30pm

- *How do you consistently achieve over 300 g/day liveweight gain from lambs?* Dave Stevens (AgResearch) and farmer
- *What ryegrass should I really sow?* Tom Fraser (AgResearch) and Grant Edwards (Lincoln University)
- *Improving pasture utilisation – what can the sectors learn from each other?* Jeremy Savage (Dairy Consultant) and Wayne Allan (Sheep and Beef Consultant)
- *How do I make legumes work on my dryland?* Richard Green (Facilitator) and Derrick Moot (Lincoln University)

Plenary Session Speakers

The Plenary speakers will lead off the scientific papers every day and we are taking this opportunity to introduce the international speakers. The full Plenary programme and Speaker introductions are available on the website (www.grassland.org).

Peter Cornish was Foundation Fairfax Professor of Agriculture (Farming Systems) at the University of Western Sydney and now has a part-time appointment to a personal Chair. He is also an Adjunct Professor at the Centre for Integrated Catchment Assessment and Management at the Australian National University. Peter has a BScAgr (Hons) from the University of Sydney and a PhD from the University of New England. He is a specialist in farming systems research, with a background in soil science and agronomy. Major research areas include soil, plant, water and phosphorus relations, farming system design and analysis, and measurement and management of the environmental impacts of agriculture at paddock to catchment scales. He was a pioneer of no-till farming in Australia. In 2002 Peter received the Prime Minister's Award for Excellence in Public Sector Administration (with the Grains Research and Development Corporation) and in 2009 he was Guest Editor of a Special Issue of *Crop and Pasture Science* dealing with low P farming systems.



John Mullen worked at NSW Agriculture for 42 years until March 2009 and is now an Adjunct Professor in the Institute of Land, Water and Society at Charles Sturt University. He has been described as a 'failed retiree'. He has Bachelor's and Master's degrees in Agricultural Economics at the University of New England and a PhD from Texas A&M University. He is a Distinguished Fellow and Past President of the Australian Agricultural and Resource Economics Society and was a co-editor of the Australian Journal of Agricultural and Resource Economics. He is best known for his research into the contribution of public research and development to productivity growth in Australian agriculture.



Michael Robertson is a Principal Research Scientist with CSIRO Sustainable Ecosystems in Perth, where he leads a national group of researchers focussing on sustainable agricultural land management. Michael is originally from Christchurch and has a BAgSci (Hons) from Lincoln University, a PhD in crop physiology from the University of Queensland and did a post-doc at Michigan State University. He has a keen interest in crop agronomy, simulation modelling and exploring the sustainability of farming systems and has published widely on these topics in systems featuring sugarcane, temperate and tropical grain crops, pastures and agroforestry. His more recent research interests encompass precision agriculture, crop-livestock integration and managing climate variability and climate change in broadacre agriculture.



Systems research in farming is often defined by the use of modelling or farmlet experiments. Both of these approaches get criticised. Modelling is often criticised as lacking in depth while farmlet studies suffer from lack of replication and scientific power.

Systems thinking and research goes well beyond both approaches. We need to understand the extent of systems thinking and research so that we can make the most of the tremendous power that can be harnessed by this approach. This is the first of a series of articles that provides some context and debate around the role of systems thinking and research in our understanding of grassland farming.

Examining a system, be it farm or otherwise, as a whole, provides both unique insights and challenges. So how do we further our understanding of systems? A discipline called systems thinking provides an approach that considers all elements of a system and tries to understand what the outcomes might be when they interact (Maani & Cavana, 2000). Systems research is putting elements of the system together to see what interactions might be expressed.

What sets the systems approach apart from our normal approach to research is its all inclusive nature. Most of the research we do is labelled reductionist. This means that we control as much of the variation as possible so that we can examine one factor at a time. For example if we were to look at fertiliser responses we try to control everything else that might influence pasture production, so that we view only the response to, say, added nitrogen fertiliser. Examining the use of nitrogen fertiliser in a whole farm system would involve a range of uncontrolled variation such as grazing management, rainfall, product prices, pasture quality... the list goes on.

As you can see from the example, systems research becomes very complicated, very quickly, much like farming. We also see that simple explanations are often hard to find because of the interacting factors. Unravelling the complexity of systems research requires several approaches (Jackson 2003).

The systems' thinking approach may have started with the Greek philosophers, but more recently was used by biologists in the 1920's and 30's to express how organisms appeared to be more than the sum of parts (Jackson 2003) and coined phrases such as open and closed systems. Physicists also used the approach as they challenged Newtonian physics.

Engineers began to use systems thinking during the Second World War, as a way of rationalising approaches to solving problems. The actual discipline of systems thinking developed further in the engineering realm as the idea of feed back loops and the importance of control and communication was added (Jackson 2003). Business management added elements of the

social system, such as purpose, ethics and values (Jackson 2003).

As the discipline has developed, tools have developed alongside it, depending on which discipline was using it. The engineers developed modelling as a chief tool. This involved converting what they could see into a series of mathematical equations (as engineers do) to develop models that would then mimic reality to ensure we could run virtual comparisons and move quickly to the most probable answer/solution.

When business management was using it, tools such as mind maps and causal loops were developed to understand the human decision making element that so strongly influences implementation in all of our systems (Maani & Cavana 2000). Peter Senge (1990) published the book *The Fifth Discipline* promoted system dynamics and put the concept of systems thinking and research into the public arena.

Flood & Jackson (1991) developed methodologies to attempt to bring together what had been relatively separate system thinking approaches with the idea that systems of process, structure or organisation, meaning, and fairness or power all needed to be examined when trying to understand the outcomes of complex systems. On a farm this would be the biological system (process), the managements imposed on the farm (organisation), labour and knowledge (meaning) and decision-making (fairness and power).

This is a brief introduction to the whole area of systems thinking and research. Many think of it as a social science, but it really did start in science and has a large role to play in moving our farming forward.

The real power from this approach will come when we use systems thinking to link the biology of soils, pastures, and animals to the resource allocation of labour, land and capital, and on to the emotions and rationales of the human elements that finally implement actions that harness the power of the systems we research. With that statement you can see how complicated we can make it if we don't draw boundaries around the systems that we research. However, often new discoveries in one area will not be implemented in the next if a systems approach to understanding is not used. This means then that we must embrace the elements of systems thinking in our pursuit of furthering our pastoral farming.

Jackson, M.C. 2003. Systems thinking - creative holism for managers. John Wiley & Sons, Chichester, UK.

Maani, K.E. Cavana, R.Y. 2000. Systems thinking and modelling - Understanding change and complexity. Prentice Hall NZ.

Flood, R.L., Jackson, M.C. 1991. Creative problem solving: Total Systems Intervention. John Wiley & Sons Chichester, UK.

Senge, P.M. 1990. The fifth discipline: the art and practice of the learning organisation. Doubleday/Currency, New York.



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The Wonderland world of carbon trading

(published in NBR 7.05.2010)

Prof Jacqueline Rowarth , Massey University

The carbon market is based on the lack of delivery of an invisible substance to no one, according to Mark Schapiro, senior correspondent at the Center for Investigative Reporting, Berkley, California. In a substantial article in Harper's Magazine in February this year, Schapiro pointed out that in the traditional commodities market, at some moment in time something (the commodity) is delivered in physical form to somebody (the person paying) - in marked contrast to the current system for carbon. His article made it very clear that the people gaining in the carbon market were those employed to validate the intangible, and to verify the invisible..... He also suggested that the environment might not be benefitting at all.

The problem with the carbon market appears to be not only the whole concept of intangible and invisible, but also that the process of validation and verification is fraught with what Schapiro describes as 'obstacles of definition, involving as it does a conceptual leap in to the future'.

Additionality is the first obstacle to overcome. 'Additionality' reflects activity that is not business as usual and proving additionality is a fundamental requirement for gaining credits: there must be proof that the claimed reduction in carbon emissions or increase in sequestration is a deliberate change in behaviour for the better.

And then there must be quantification of the change. This is challenging in itself – the United Nations Intergovernmental Panel on Climate Change estimates that the margin of error in measuring emissions from the oil, gas and coal industries is 60%; for some agricultural processes the margin can be as high as 100%.

The latest official estimates for New Zealand emissions of greenhouse gases over the 2008 to 2012 period, which include the estimated effects of the ETS scheduled to begin on July 1st, indicate that two million tonnes of projected emission have been saved. The saving (which translates to \$16 million) reflects the unexpected effects of the drought and destocking, but the net removal of carbon in forestry is not as great as expected because 'more accurate land-use mapping has shown that the area of plantation forestry is not as great as previously estimated, and some deforestation of native forest had not been included in the projections'.

The projection period is only half over, but we are celebrating the projected savings on the projections..... Not surprising, then, that debate on whether New Zealand should or shouldn't be involved in the Kyoto Protocol, and what it might do to our trading position, continues.

When agriculture comes in to the Emissions Trading Scheme (ETS) in 2015, Fonterra will be paying \$107 million a year – a cost that will be reflected in household food bills and reduced payout to farmers and which will also reduce competitiveness in the international market.

Of further concern is that the \$107 million bill will have a negative impact on investment in research and development, which as KPMG indicated in their inaugural Agribusiness

Agenda, is vital in order to move New Zealand agriculture from the current low cost production position to efficient and sustainable production systems.

The ETS will be reviewed next year, but has already achieved a life of its own. Dr Nick Smith, Climate Change Minister, hit the nail on the head in his comment (reported in NBR last week) on the importance of the ETS in realising investments in forestry plantings over the last 20 years.

The carbon market exists only because world leaders have decided it exists. They determine the demand by setting emissions limits and the supply by establishing criteria for offsets. Although people in the developed world can be grateful for being alerted to the carbon issue the reality is that many people are regarding it as 'Somebody Else's Problem'. Professor David MacKay, Chief Scientific Advisor to the UK Department of Energy and Climate Change, seconded from the Department of Physics at the University of Cambridge, has calculated the effect of carbon price on consumer behaviour. At US\$150 domestic heating use is affected. At US\$400 car use might change in the USA but not until US\$900 will car use in the UK change. Carbon dioxide is currently trading at approximately US\$20.

Professor MacKay suggests that a carbon-trading price of at least US\$100 should be guaranteed by politicians to ensure that investment in carbon capture mechanisms occurs in an attempt to offset carbon release in fossil fuel. He has shown that as long as carbon is not priced correctly, people will use it to support their current lifestyles. Like the KPMG report, Professor MacKay concludes that more investment in science, technology and infrastructure is needed.

The challenge for the world is to show that the needed research will generate a positive return. Headlines such as 'The fools gold of carbon trading' have been around for a while, yet if New Zealand pulls out of the Kyoto, the 'Kyoto forests' will have little value, and the New Zealand foresters and farmers will have been let down... Hence the NBR headline of last week 'Investors warned to avoid carbon price speculation'.

Mark Schapiro concluded that the carbon market is, in essence, an elaborate shell game, a disappearing act that nicely serves the immediate interests of the world's governments but fails to meet the challenges of our looming environmental crisis'.

Carbon trading could be another case of 'Emperor's new clothes'.

Professor MacKay's book 'Sustainable Energy – without the hot air' is available free on-line

www.withouthotair.com

Mark Schapiro's article 'Conning the climate' is available at www.citizensclimatelobby.org/files/Conning-the-Climate.pdf