

The Farmers Club Charitable Trust - Travel Research Scholarship

Knowledge Transfer for learners;

to improve effectiveness and on-farm outcomes

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1 Introduction

When looking to up skill and gain knowledge in particular subject, or a means of improving your work life or business there are many avenues to explore depending on your learning style and preference. In the UK's agricultural sector there are plentiful knowledge transfer (KT) learning opportunities in the form of open days, events, discussion groups, workshops, e-learning, blogs etc. KT is the practical means of transferring knowledge from one person to another and KT is a 'term used to encompass a very broad range of activities to support mutually beneficial collaborations between universities, businesses and the public sector' (www.cam.ac.uk/research/news/what-is-knowledge-transfer).

By travelling to New Zealand the objective was to gain an insight for improvement in my work by visiting science into practice organisations that specialise in KT. I was looking to gain an understanding of how KT sessions are planned and implemented in the farming communities of New Zealand in order to help maximise the experience of learners to therefore implement new skills and knowledge. A key element in my role is to improve and develop the link between our work with the industry/farming community and the curriculum experience of our students; to move beyond the point of inviting students to farmer KT events, to a position where our KT effort meets the needs of both the current and future farming generations, ie students. It is hoped that the findings and improvements to the delivery will encourage positive change in farm businesses through KT for farmers and farm workers, as well as seeding change through the education of the next generation via the College curriculum.



2 New Zealand- The Background

In order to further my knowledge and skills through my opportunity to travel I chose to investigate KT practice in the dairy grassland systems of New Zealand. New Zealand is the world's largest dairy and sheep meat exporter and the industry has a highly competitive primary production and distribution infrastructure, despite being further from the world's agricultural markets than any other major producers (www.newzealandnow.govt.nz). 5% of dairy stays in New Zealand and 95% dairy commodities are exported with export producing 40% of income on gross domestic turnover. Many of New Zealand's leading agri-science research facilities are based in the North Island in Waikato and research and development is also a key contributor to the economy.

There are 'dairy dense' areas in both Islands. In the province of Waikato in the North Island and Canterbury in the South Island, approximately 6.4 million dairy (3.6 million beef cattle) outnumber the 4.6 million population of both Islands. The dairy sector is continuing to grow and it has been estimated that at least 2,000 more workers every year are needed to cater for growth in the sector. New Zealand farmers receive no subsidies which has been said to encourage a focus on low-cost, high productivity farming systems.

Under the commodities levies act, Levy bodies Beef and Lamb New Zealand (B+LNZ) and DairyNZ organise a referendum every 6 years. All producers are encouraged to vote on whether they wish to continue to contribute through levy payment to fund KT activities and other sector programmes such as 'Primary Growth Partnership', 'The Heifer Grazing Project', 'Forages for Reduced Nitrate Leaching Program', 'Pillars of a Sustainable Dairy System' (full details at www.dairynz.co.nz/about-us/dairy-industry-strategy/) over the next 6 year period. B+LNZ carried out in 2015, DairyNZ was carried out June 2014. Both voted to remain paying the levy.

The New Zealand dairy sector is grass based imported feed is fed in varying quantities on individual farms. DairyNZ have identified 'The Five Production Systems' based on feed fed per cow to dry or lactating cows during the season and also by the amount of imported feed and/or off farm grazing (Definitions appendix 1, the definitions do not include grazing or feed for young stock).

3 Aims and Objectives of travel

The aim of the trip was to meet with and discuss with as many and as much of a cross section of individuals that either deliver or partake in KT and extension work as a means of delivery/learning in order to improve the profitability of their business. By talking to a cross section of those involved in KT I hoped to build a picture of how others carry out and see KT. Prior to travel I organised an itinerary which included the following; meetings with farmers, discussion group members, universities, levy boards, industry, vet group, on farm visits, seminar and demonstration event. The focus of my research was predominantly in the dairy sector, however I found that as I planned my itinerary additional relevant KT contacts were made, these included beef and lamb and other specific groups that focussed on KT for women. I chose to contact organisations that have a strong learning support and networks for grassland agricultural students and farmers.

I planned a 'North to South' route, arriving into Auckland in the North Island, I travelled south to Hamilton and surrounding areas (Waikato), travelling south west to the New Plymouth area (Taranaki), south again to Palmerston North (Manawatu) and then on to Wellington. Crossing Cook's Strait via the ferry from Wellington into Picton (Nelson), in the South Island I travelled south to Christchurch, Timaru and finishing in Fairlie (Canterbury).



Figure 1 Route Map

Due to varied nature of the meetings and information gathering throughout my trip, each meeting questions and discussion was tailored to suit the role of person/situation in order to acquire the maximum relevant information.

For the purpose of this report I have collated the information and I have grouped the following points as a guideline.

KT – the background and delivery

- What work is done with discussion groups/extension teams, demonstration, monitor, research farms, what is the structure?
- How does industry contribute to KT?
- Use of on-line learning tools, eg blog, on-line courses, webinars

KT – Students and farmers

- Student engagement- on farm trial work and data collection
- Can farmers/students mix in meetings? How do you see this?
- How to improve the link between KT sessions and curriculum – to the benefit of both?

KT – The knowledge gap between research and on farm practice

- Do you think there is a knowledge gap between research and on farm practice?
- Research data dissemination- to farm level and implementation-How?
- Farmer engagement with research, do you think they see?

4 People and places

4.1 Public perception of farming

It was clear throughout my trip that there was huge awareness of farming by the general public in everyday life. Farming updates and issues are regularly on the news, press and various publications and a weekly TV program (much like Country File). The public are continually updated on the current state of the industry. Whilst driving throughout my trip I heard countless mentions on the radio referring to farming, about the current news at that time. I cannot recall that in the UK the farming has such a presence on the radio. The general public were aware of the reduced milk price and were knowledgeable of the knock on effect on other trades and industries. For example a supermarket owner had said to me that he had noticed and was aware of the impact and a decrease grocery spend when farming is not doing so well. The general public are also aware of other factors that can present challenges, for example drought and increased costs for farmers, ie additional feed and the possible effect on milk production. It was said that in the past everyone in New Zealand was either related to, or knows someone, or has known someone, in farming.

There is regional variation of knowledge of dairying/farming so people are less awareness in Auckland and Wellington and more aware in Hamilton. Bearing in mind that my trip took me through dairy dense areas, my thought is that the public awareness of agriculture is much higher in New Zealand than in the UK.

Agriculture is kept in the minds of the general public and is highly visible with a large number of agricultural stores along my route, especially in the dairy dense areas. Farming is a very

well respected industry in New Zealand, probably as its contribution to the economy is significant at 40% of income on gross domestic turnover.

This public awareness can only be seen as positive as a support to the farming community. However with the increase in public awareness there is also the potential for negative publicity. There were topics that I became aware of during my trip, these included, water course pollution (bad press on 'dirty water' in waterways causing pollution-DairyNZ (New Zealand levy board for dairy) delivery of KT on effluent management and nitrogen leeching and environmental impact) feeding of palm kernel (milk processors have requested as part of their contract that farmers to reduce/not feed it) and the perception that through the decrease in milk price there may job losses. Levy boards, government and industry are quick to act on rectifying any negative publicity, with the communications channels already set up there is always a quick response. In order to assess the public's perception of dairying DairyNZ hold regular focus groups with members of the public and the last survey results said '70% of persons are OK with farming'. In order to maintain the public's connection to farming they now hold on farm events for the public much like Open Farm Sunday. DairyNZ have also created learning resources for schools at all levels.

4.2 Challenges and Change

Meeting with a cross section of industry contacts and establishments that carry out extension and KT I found that like the UK there is a variety of options and offerings for farmers to engage in learning. Perhaps the biggest challenge for each individual is to find out what learning environment works for them.

Like the UK, New Zealand experiences challenges in the agricultural sectors, currently the drop in milk price is having an effect on profitability. In New Zealand they have the additional regular challenge of drought, a big problem in non-irrigated regions. When challenges present themselves it forces businesses to open their eyes on how to become more efficient and lean. It was suggested that some businesses probably let slip the good practice of efficiency when the milk price rises, it was also suggested that some businesses 'coasted' in the 'good times', however businesses should strive to be efficient and lean even when the milk price is good, as best practice.

The challenges with drought have seen a knock on effect on fertility which has driven some farmers to switch from an all grass self-contained system (system 1) to a new system- pasture plus and to feed concentrate at varying levels (systems 2-5 – see Appendix 1). This change in herd management has driven the need to learn new practice, farmers then seek out the various levels of learning needed to manage their business according to the new system. To accommodate this need DairyNZ deliver a series of workshops, meetings and discussion groups for various levels and learner needs. For example 'pasture plus' which covers practical and field based topics. Progression groups are suited to those who want to enhance their skills and career options with levels to suit farm assistants (1 year in the job), herd managers and assistant manager/farm manager and operations manager, tailored to fit with the knowledge and position for the various members of the staff within a business.

It could be argued that in any country the varying challenges specific to the business encourages farmer's to up-skill to manage a new or different practice. When planning or delivering KT, the question is; how do you influence people, what are their principles and how to influence them to make a change? In challenging times making a change would be the

obvious thing to do, however there is always the 'head in the sand option', which can be found in any country in any industry.

4.3 The Initial need for Information- what do learners know?

In the first instance organisers of KT advised that it was important to identify what delegates know currently and what their objectives are. 'It is key that learners realise what they know and what their learning needs are'. Knowing what your role entails and job description is key in identifying the learning requirements'. This will enable each individual to determine the right learning tool/event/course to suit their needs. This is obvious to highlight, but one would question whether this happens in all farm business staffing structures.

Dairy Production Systems Vet Group said of their extension work, they stressed 'understand your clients/business and relate to the client/farmer to know and recommend. Farmers all have different goals, it is important to find out what each individual's goals are. This needs teasing out. Every farmer/farm system is different. Farmers operate at different levels that is why they (the vet practice) specialise in the one to one KT input'.

But what actually attracts and motivates a farmer to attend KT of any type? 'Topic, speaker, social aspect, where/venue, reasonable travel time, new technology, this will be dictated by the self-motivation of each individual'.

4.4 Psychology and KT- What works?

The psychology of how people learn came into discussion a number of times throughout my trip. There are many influencing factors to consider, dealing with people, each individual is different, with different approaches and ideas. Also to take into consideration is that adults learn differently. When looking at KT to encourage change there is a need to change the knowledge, attitude, skills and aspirations. The Agri Women's Development Trust engages with psychologist's out-with agriculture to design the format of KT sessions, agricultural specialists provide the content to ensure maximum effect for the learner.

A key question asked was 'How to influence other people, what are their principles, how to influence them to make a change?' Ultimately any KT carried out is looking for this outcome for the benefit of the learners business and/or career. So the format of the KT has to suit the learner, the deliverer should have the soft skills and unless it is a one to one KT, what size group works best for learning? What makes KT effective in encouraging making a change?

Feedback during my trip suggested the following;

- KT 1 to 1 was found to be the most effective for learning and making a change
- 1 to a few up to 14 was a good number for encouraging engagement throughout the KT session.
- Small groups (6-14 persons) on a 2 day programme were seen to be very effective; this encouraged a learning culture, trust and openness.
- Small groups (6-14 persons) in a programme over up to 5 days improved the above
- Small groups (6-14 persons) who met regularly have trust and willingness to share information at a sensitive level and are highly likely to make changes
- Large (20 plus persons) groups were good for sharing information but not necessarily for implementing change

- Peers in a group are very powerful

There is a mix of free and cost to attend KT, however the restrictions in attending courses were said to be distance (not in some cases see section 9.1) not time or money. It was found that people would generally travel up to two hours to attend, whether KT was free or there was a charge to attend. If the learner sees the value in the KT and relevant to their needs, this would influence their decision to attend. Group KT work suits New Zealand farmers as 'they are generally willing to share information by benchmarking giving a healthy competitiveness and exchange of information'. There is a ripple effect where all focus is on forward thinking farmers to then disseminate information from them, farmers engage well as there is a relationship and trust.

It was evident that, especially during challenging times that there is a need to put a value on making a change, providing cost benefit scenarios and using the evidence from the demonstration/monitor/research farms is an essential source of proof. It was said that learning occurs 1/3 from the KT session, 1/3 from each other and 1/3 from putting into practice; KT is of most benefit when following learning there is implementation of new practice.

Support after a training event is seen as a key element in making a change; a farmer looking to implement a new idea on their farm is more likely to do so when reassured that there is support throughout the process.

An emphasis from industry was to have a planned KT delivery schedule, regular events that followed a time line and topical to the challenges happening/expected at that time of year. It was evident that industry is keen to provide learning options that fit the farmer's needs. There was an increase in topics focusing on financial/business efficiencies which has been influenced by the drop in milk price.

The perception is that New Zealand farmers are more pro-active; however in all cases no matter which country there is always an element of self-responsibility so it is always up to each individual to motivate themselves to learn and improve.

5 Levy Boards

5.1 DairyNZ

DairyNZ is the industry organisation, representing New Zealand's dairy farmers. DairyNZ is funded by a levy on milk solids and through government investment, the purpose is to secure and enhance the profitability, sustainability and competitiveness of New Zealand dairy farming.

Having met with a number of DairyNZ staff in a variety of roles throughout my trip I found that they had an extensive offering of KT. Backed up by workbooks and website, extension teams work in every region of both islands and the staffing was dictated by how 'dairy dense' each region is. In response to the drop in milk price DairyNZ launched the 'Tactics for Tight Times initiative' (TTT) which encouraged farmers to suggest what topics they are looking for additional information as a learning need, this included; 'feed management tool/demonstrations/tools to identify how to reduce the cost of production- to become more

efficient and lean/ repairs on maintenance and reducing fertiliser costs without affecting productivity.

DairyNZ's team of 40 extension officers (EO) currently (Sept 2015) have contact with 60% of dairy farmers, this is an increase from 36% in 2005 and are continually looking to increase engagement for improved profitability. DairyNZ inspires to provide better training of EOs, including soft skills, Soft skills are the character traits and interpersonal skills of an individual, to be aware of this and improve these skills can enhance a person's relationships with other people, especially beneficial in a KT organisational/facilitation role. This will therefore enhance and complement the KT experience and engagement with learners.

DairyNZ have recognised that soft skills are very important for the facilitation of KT and therefore engagement of farmers in the KT offered. EO's go through an on-going training process in order to deliver sessions as effectively as possible.

EOs are tasked with organising the delivery of nine meetings a year for six individual discussion groups. Group meetings are based on farm initially to establish an overview of the farm business, looking practically at business and carrying an initial farm assessment looking at farm infrastructure with an action plan for improvements and best practice. This is followed up by the EO team to encourage changes where required to encourage change for improvement.

DairyNZ plan and deliver various workshop sessions that are pitched at different levels of knowledge and set up to suit different learning styles. The groups are farmer led and driven, farmers must take ownership of the group- farmers rally the others in the group to attend. The farmers in the groups also decide what subjects they would like to cover, the sessions therefore meeting their learning needs. All workshops are backed up with hard copy booklets for use on farm. To benchmark within the group farmers use 'DairyBase' the DairyNZ data collection system.

Dairy NZ DairyBase is a data collection tool for dairy farmers on all systems to generate key performance indicators (KPIs) using detail from physical and financial data collected. Approximately 15% of farmers have engaged in this free service. Within the data collection it asks what your aims and goals are, assessment of the farm data then establishes whether this matches the aims and goals set. On-going data collection over years clearly gives a better picture of the business and records efficiencies over time. The use of the DairyBase data collection as a business tool was said to be hugely beneficial for benchmarking.

5.1.1 Research Farms

Research carried out by DairyNZ on research farms in collaboration with industry, universities and Agresearch plant and food research. The research topic is dictated/decided partly by government and partly by levy led research depending on the need. In Waikato I visited Lye and Scott farm, 300 and 400 hundred cows respectively. Lye Farm focuses on individual cow research, Scott Farm focuses on field research for example nitrogen loss/water quality.



Figure 2. Leaching trial, collection of water 60cm depth to test for nitrogen levels

Previous/current research include;

- Milking frequency - Once a day/twice a day and three times a day milking- Three times a day showed no increase in milk solids
- Robot milker - was found not to be economical for system 1 dairying
- Increase in fertility - Ten week mating-no flexibility, target- 78% in calf in the first 6 weeks- ongoing
- Standing pad - Cows in on pad for 8 hours to reduce nitrogen/contamination in soil from urine- on going

The farms host regular group days to talk about the research progress and outcome, milk from pasture days and also school groups to highlight the various careers there are in both research and agriculture. A clear message of KT to demonstrate the variety of potential opportunities in the agriculture and research industries.

5.1.2 Demonstration and Monitor Farms

DairyNZ Demonstration and monitor farms are prominent as a learning tool in New Zealand, they are used for research purposes and learning resource for land based colleges/universities and industry training organisations. These were said to work well and an excellent link to industries and FE/HE colleges and universities. In the New Plymouth area I visited the 'Waimate West' Monitor Farm; 127 Jersey cows on 38 hectares. This monitor farm holds two open days and one demonstration day a year to communicate trial progress, details and data, previous trials include stocking rate and once a day milking.



Figure 3. DairyNZ Waimate West Monitor Farm Jersey herd



Figure 4. DairyNZ Waimate West Monitor Farm Jersey calves

5.1.3 Support

The structures, systems and resources in place mean that DairyNZ are very good at finding out what farmers want to learn about. Office support carries out survey work, following up for feedback after meetings and find out what the future learning needs are direct from the farmer. Case studies outlining success stories of farmers making improvements in business efficiencies following KT are created to encourage engagement. DairyNZ are aware that KT can be restricting due to time/personality/independent learning. Following a survey in 2015 70% of dairy farmers said that they did see the value of the levy. With regard to the demonstration and research farms, they were very open about what they do and the farm information.

5.2 Beef and Lamb New Zealand

In Wellington I visited Beef and Lamb New Zealand (B+LNZ) head office. B+LNZ is the farmer owned and farmer-funded organisation for the beef and lamb sector, created by farmers to make it easy to get on and farm. B+LNZ has a board of six farmer elected representatives, three in each island and two industry nominees. There are twelve B+LNZ extension staff who work alongside seven regional Farmer Councils to deliver Regional Delivery Plans (RDPs) which are relevant to the various regions. These RDPs are focused strongly on practice change, customised to suit the needs of each region.

B+LNZ farmer councils are instrumental in designing the KT projects and work to deliver benefits for beef and lamb farmers, it is their organisation with the strapline 'By farmers. For farmers'. The focus is on 'developing farm and farm capability by delivering knowledge that drives farm performance'.

B+LNZ organise various types of KT sessions to meet the beef and sheep farmer's needs, these include; project farms, farming for profit workshops, profit partnership, farmer focus groups, demonstration farms, practical skills, topical meetings on what's relevant/issues at the time, on farm research and seminars.

The activity and involvement of farmers is to lead and drive groups alongside the B+LNZ EOs technical and operational support. They also involve specialists/research scientists, which has positively engaged farmers locally to be part of a group and/or lead the group. Within the demonstration farm groups farmers take responsibility of the budget/programme of meetings to give a real sense of ownership and commitment for farmers to lead and drive the group. There is a criteria of targets that each group are set, these are business performance related. As a support mechanism the EO's for each group give guidelines/parameters and support for the farmers to drive the groups forward. Demonstration group farmers have real 'buy in' to achieve financial/physical targets- the involvement in these types of groups means the farmers involved really do want to make changes to improve profitability and on farm efficiencies.

Further work B+LNZ are carrying out include 'Red meat profit partnership; to undertake research-extension models with Agrisearch and to research behaviour; 'Willingness to change'-what makes high performing farmers 'tick', looking at the psychology involved in farmers decision making and involvement with KT.

Through monthly farmer phone surveys data is collected to understand whether farmers are aware of B+LNZ's KT activities and other work carried out for the beef and lamb sector and feedback following KT. This information allows B+LNZ to adjust its activities regionally where appropriate. Like DairyNZ the resources are in place to be in regular contact with the sector's farmer's gives valuable information and also to build relationships.

6 Focus on KT for Women

The Dairy Women's Network (DWN) and the Agri Women's Development Trust (AWDT) have identified a need for learning targeted at women in agriculture. Both have a strong link with industry and continue to engage through the KT work. They say 'there is a need to change how the sector sees women and how women view themselves'.

It has been identified that there is a distinct difference in men and women's learning technique and, in addition on farm men and women carry out different roles (generally). The expression 'turning tables' was used as sharing of information is different as it is seen by women in agriculture as 'needs based learning'.

DWN, now in its 25th year is led by three strategic ladies, there are 35 regional groups throughout both Island and in each group there are three or four lady farmer coordinators that drive the group activity. KT is chosen, developed and driven by farmers of the group. The type of activity includes training days, modules which are completed over time and an annual conference. There are four strategic focus areas; leadership, financial, compliance and farm environment. DWN have found that informal learning is better for women and say that events and modules are free to attend, 'this is to create a positive attitude to learning'. KT topics are targeted towards the type of roles women carry out on farm which includes; 'the well-oiled office', 'understand your farm business; finance and business planning', 'calf rearing to calving'. Following training DWN say that 'a couple can have different conversations about their businesses'. The woman is a critical farming partner and by engaging in KT this changes the women's view of themselves. Supported by levy boards and industry the KT carried out is seen as credible throughout industry.

AWDT state that 'the woman needs to have a clear view of themselves, then they can start (with training)'. The courses have an application process to define the right fit for each individual's learning aspirations. Courses are designed by psychologists and any research details used for training purposes are translated to farm level and used for training purposes. AWDT say that learning is about confidence and connection with the other women in the group. 'You need to understand their life's and life's of other women and or any problems, create a culture of trust and you will find there is a need for interaction, company with them then turns into comradery'. AWDT continue to say 'organising any KT you have to see it from the eyes of the person you are trying to help/influence- what are their current interactions and beliefs? Treat each person as an individual'.

7 KT - The One to One Approach

Alltech provide added value to clients through one to one support and on farm audits I spent a day on farm with Ale, an Alltech sales technician. Relationships are very important in KT; it builds trust and encourages change in practice for improvements. The on farm audit carried out that day used DairyNZ resources for condition scoring the herd, clamp management and a dung samples that were sieved. Ale said that Alltech clients are very knowledgeable and understand research and science and, when attending events do see the value of the research



carried out. However she continued; 'there is a need for transparent communications, everything needs to be transferrable and achievable to implement on their farm. Farmers are looking at efficiencies and welfare, they are looking at getting more from cows not necessarily more land. They do see the value of the on farm audits as a support for their decision making within their businesses.

Figure 5- On farm audit, clamp management

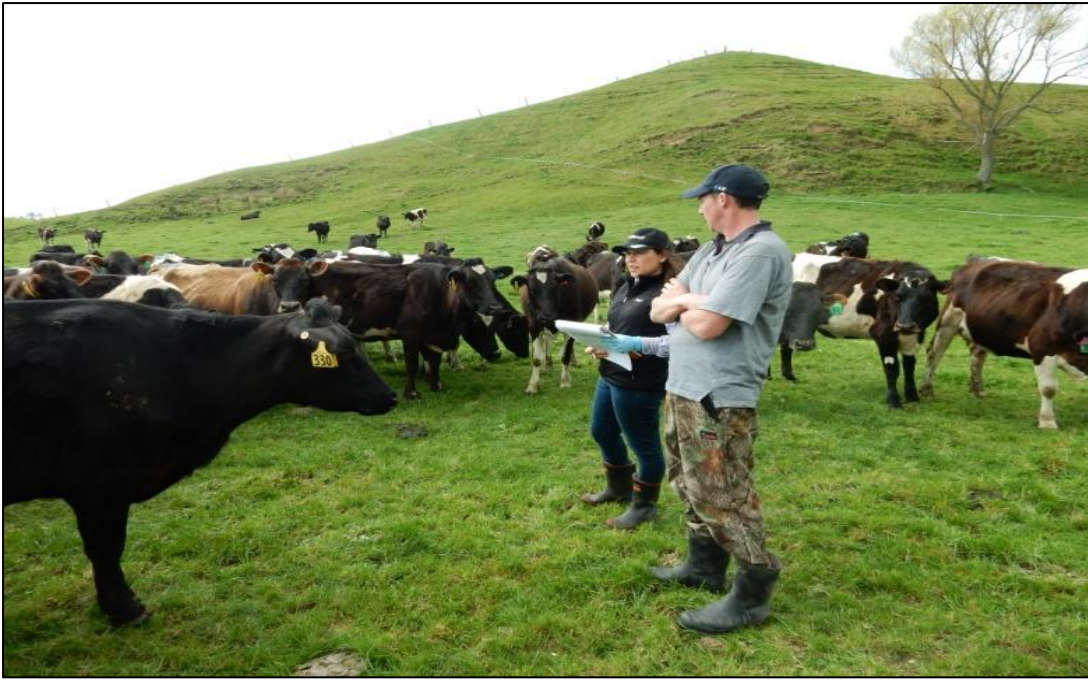


Figure 6. On farm audit, condition scoring cows



Figure 7. On farm audit, muck sieving

Dairy Production Systems Vet Group stated 'one size does not fit all' each farm and farmer is an individual. They emphasised the value of knowing each client's farm business and their aims and goals. They also said that farmers preferred the one to one approach for KT, there is already trust and relationship with your vet; it is a real personal approach'. 'Farmers all have different goals, it is important to find out what each individual's goals are. This needs teasing out. Every farmer/farm system is different. Farmers operate at different levels and that's why they (Dairy Production Systems Vet Group) specialise in one to one KT input. Time is of the essence, farmers are bombarded with open meetings and any time spent in KT must bring

value to the farmer. All our clients are looking at efficient practice to gain maximum kg milk through kg DM fed. This is not a new concept; cutting costs to save money without having a long term detriment to the farm business.

Brian McKay (Dairy Production Systems Vet Group) stated, 'we need to set out a clear set of principles which the farmer can adapt to his/her own system. The key to success is to have support when implementing any changes this gives the farmer confidence in trying new things. When discussing KT with Ant Roberts (Ravensdown Fertiliser Cooperative Limited), he said 'thee problem with research and technology is that it can be used it but the numbers/biology may not be fully understood. This is where the one to one approach can support in the translation to farm level. Help to change behaviour by showing possible profits, this is applicable for all sectors/size units'. Finally it was pointed out to me 'do not assume the successful farmers are the big farms'.

8 Knowledge Gap between Research and on Farm Practice

Having visited DairyNZ research farms Scott and Lye in Waikato this gave me an insight into the extent of their research carried out, however my key question was how the findings of any research were communicated out?

Researchers are academics, it was suggested that they (researchers) need to talk about the real problems farmers' face-find out what they are and research how to solve them. There are various means of bridging the link between research and on farm practice.

University PhD research students are an excellent link, they are directly involved with the research, and also present their research at events/to farmer groups about their research, therefore are talking to farmers about their research on a practical level.

Having researchers and PhD students working together with industry helps to ensure that the knowledge gap between science and on farm practice is minimised. This works well as demonstrated by research student Rachel Bryant at the Lincoln University Demonstration Farm Open day 'research scientists are very hands on'. (See section 9.2).



Figure 8. PhD student Rachel Bryant (left hand side) field discussion.

The challenge was said to be that competent based research is hard to test due to other factors on farm situations, for example the environment. It was suggested that any research should be realistic to farm practice so farmers can see how this would fit his/her system.

To alleviate any disjoint of science knowledge into practice it was suggested that research needs to be tested not only on the research location but also on an on-farm situation, for example on a demonstration farm over time to test whether it works on the whole farm system.

DairyNZ research farm data collected is interpreted by scientists and compiled into resources by developers that turn the science into terminology to enable practical application for the farmer to use on their farm. Data analysis and results are included in the 'Farming Times' as an ongoing update for farmers. They said that 'we always look to make science practical and therefore develop new tools for communication at farm level'.

A farmer had commented that DairyNZ 'could be better if they were more open minded. Research is done mostly on pasture based system so totally unfair for farmers not on system one', he continued 'this also reflects on high input system discussion groups, they are not held so often as there are less farmers on these systems'. I would imagine that the research should shift to include the systems 2-5 to encourage engagement with farmers on all systems.

Overall there is a need for transparent communications; everything needs to be transferrable to bring home on farm. It justifies what processes farmers have in place and could be used and helps make decisions'. To bridge the KT gap proactive farmers in discussion groups could be used to translate (the science into practice) to engage other farmers in different practice.

9 Universities

9.1 Massey University -OneFarm Farm Management Connectivity Seminar, 6th October 2015

AgriOne is a joint venture between Massey and Lincoln Universities; this includes the initiative 'OneFarm'. OneFarm online resource was established five years ago and is dedicated to providing an improved understanding of farm business management. The package of information includes; research, blogs, resources, education and a 'live' toolbox it is looking to provide support for improvements for farmers. OneFarm has a strong link with industry and works closely with the levy boards.

OneFarm as an online KT resource is populated by a community of researchers, industry, farmers and students to deliver relevant information and regular updates on research outcomes. OneFarm blogs is a means of discussing ideas and best practice advice. Communication via blogs and social media is seen as 'normal' these days and it was said to make it 'more 'real and human'.

OneFarm seminars are organised to link on line networks with industry, it is an opportunity to engage and receive feedback on One Farm's progress and activity, the seminars are on-going and keeps the momentum and engagement with industry current and relevant. Seminars are hosted at alternating universities. The involvement of the two major universities, one from each island encourages engagement throughout New Zealand.

As my visit to Massey coincided with a OneFarm Connectivity seminar, I was asked to present my experiences on the delivery of KT in my role at Reaseheath College. Presentations were recorded to be added to OneFarm website as a webinar. Making presentations available via a webinar aims to create real time engagement and helps bridge the knowledge gap between science and on-farm, it also takes away any travel/time to attend (Full seminar itinerary appendix 2. To view webinar please see link, you will have to register <http://www.onefarm.ac.nz/resources/webinars/>).

The objective of this particular seminar was to receive feedback on suggested changes/improvements on what OneFarm provides farmers as an on-line resource. Also to consider 'Decision making on farm and the desire to change, how do farmers think? What can OneFarm do to improve this?' Afternoon speakers include; myself, Dave Gray, and Ben Groundwater. Attending there were over 50 delegates which were a mix of researches, students, industry and farmers from various sectors, all were a mix from both islands.



Figure 9. OneFarm Connectivity Seminar team from left to right, Natalie Bowie, Lesley Innes, Eva Schroer-Merker and Ben Groundwater.

9.2 Lincoln University Demonstration Dairy Farm Open Day 8th Oct 2015

South Island Dairying Development Centre (SIDDC) has a networking group to advance dairying in the south island. SIDDC seeks to achieve this through the expertise, resources, and services delivering innovative, practical research, technical, education, extension and training support to dairy farmers. SIDDC is in partnership with seven key New Zealand organisations involved in South Island dairying. These are Lincoln University, DairyNZ, South Island Dairy Farmers, Ravensdown Fertiliser Cooperative Limited, Plant & Food Research, Livestock Improvement Corporation (LIC), and AgResearch. I attended The Lincoln University Dairy Farm (LUDF) Open Day, held on the 5th October, these open days are organised by SIDDC and are used as means of reaching the wider farming community and a learning resource for KT. This event was attended by over 300 people, mostly farmers.

The farm is operated as a commercial farm but also implements new ideas carrying out trials that are seen to be of value by the partners and industry. The farm is run separately from the university and benchmarks against other similar farms.

Outlined on the day were the farms strategic objectives; to maximise sustainable profit embracing the whole farm system through;

- Increasing productivity
- Without increasing the farm's total environmental footprint
- While operating within definable and acceptable animal welfare targets; and

- Remaining relevant to Canterbury (and South Island) dairy farmers by demonstrating practices achievable by leading and progressive farmers
- LUDF is to accept a higher level of risk (than may be acceptable to many farmers) in the initial or transition phase of this project

During the course of the open day the farm performance, management and financial data was discussed (full details www.siddc.org.nz/lu-dairy-farm/focus-days-and-events/) and during a field walk the farm walk notes (see above link) were discussed, including grassland trail work carried out by PhD students. Farm manager, Ron Pellow said ‘as a demonstration farm it is imperative to remain reputable in industry, if people do not believe the figures and information presented on the day they will stop coming to the open days’ and as a demonstration farm you will lose your reputation as a credible means of learning’. He continued ‘pasture walks weekly is one of the most important jobs on this farm’. The next trials we are going to do is to looking at wintering on and rearing youngstock at home to improve efficiencies. Using a farm staff timesheet documents how long jobs take therefore can look at making things more efficient where appropriate.

A new initiative was launched by DairyNZ at this open day ‘workplace action plan’ where resources were available on ‘quality workplaces’. These resources have been identified as a need by both DairyNZ and Federated Farmers (similar to UK NFU) to demonstrate to the public that the dairy industry wants to be recognised as quality employer. Information was available on the day (and online) on what is good practice and requirements from both the employee and employer. DairyNZ carried out a survey (by score card) in 2012 the results were that 80% of farms had ‘good’ workplaces. Nathan Guy, Minister of primary industry and NZ dairy farmer who spoke at the event stated ‘We need to go from good to great (as employers) as 50 thousand new people are expected in the primary industries in the next 10 years (including research)’.



Figure 10. LUDF Open day. Field discussion with Farm Manager Ron Pellow (left in high visibility vest)

10 The student-farmer mix

Throughout my trip the mix of students and farmers in a KT session was viewed positively, feedback and comments include; 'very important', 'not enough mix of farmer student groups- there can be great exchange of information and farmers need to recognise that students are the farmers of tomorrow'. 'Students mix better with farmers-better to learn from each other', 'absolute definite yes this is a benefit to both'.

There is a strong focus on PhD level students with the universities and it was said that it is more difficult to engage with the HE level students purely due to the higher numbers on the course. Any interaction in a KT forum with an HE group is therefore going to be different from PhD research students. With the close network of links universities and land based colleges have with industry and levy boards throughout New Zealand there is ongoing interaction with students at the various levels.

There are numerous awards, scholarships, seminars and work placements offered to students which show the support from industry for the next generation of farmers and researchers, it is clear that agricultural careers guidance is prominent.

11 Potential benefits to students

With a strong focus of my trip linked to agricultural colleges and universities the knowledge gained has given me an insight into how the engagement with students, industry and levy boards is a key part of making students 'industry ready'. I would like to think that the KT sessions involving industry, levy board, farmers will highlight to students the benefits of 'out of curriculum' type of learning, encouraging a desire for continuous professional development sessions after they complete their course.

Student and farmer mix in KT was regarded positively throughout my trip and they see the value of exchange of knowledge between current students and farmers. This is something that in my current role I will continue to create in KT, there is clearly a benefit from the combination. KT is a means of encouraging engagement between the two should be thought of, perhaps breakout sessions in mixed groups. Involving students in the organisation and set up of the day and presentation of trial work appropriate for their course will encourage discussions with farmers. Engagement with the next generation of farmers will help to encourage improved business performance and sustainability in their future careers. I will continue to deliver KT, on the college farm where possible; to involve the relevant student group, industry and levy's to demonstrate best practice. Given the above findings I will also ensure there is a link between the theoretical classroom sessions where possible and the practical KT session.

12 Conclusions

The key lessons learnt were

- The message throughout was that the ‘farmer led and driven’ concept works and instrumental to successful engagement of farmers in KT, to a group, event or training. By having farmers actively involved in the planning, organising and delivery of KT encourages ownership and engagement from peers. Identify and use proactive farmers to lead the way.
- It is unlikely that ‘one size certainly does not fit all’. A variety of types/formats of KT are available and this, like in the UK is up to each individual learner to find their way in what works best for them. Farmers learn to choose the type of learning environment they prefer. The most important point is that it delivers value in knowledge gained and time spent by the learner. Each farmer is an individual with different aims and goals it is important to establish what level of knowledge/skill set learners have in order to influence how the learner thinks and potentially can implement change.
- A closely linked structure and network of interaction between levy boards, industry groups and industry, universities and farmers is demonstrated by the scale and depth of detail delivered at KT events. Demonstration/monitor/research/focus farms are being utilised effectively as a high level KT experience for learners. Even in my short time in New Zealand it was obvious the ‘small world’ of agriculture, it was a common thing in my trip that people knew the people I had just seen or was about to meet with. I found this an extremely supportive community catering to learners needs, and I include myself on my trip. Working collaboratively is a main element for the scale and success of KT delivery and highlights the need to continuously build and maintain relationships.
- Levy Boards’ play a huge part in the KT infrastructure, the fact that farmers have ‘opted in’ to beef, sheep and dairy levies following the recent referendums; they are ‘happy’ to continue paying the levy. This is a true sign that they do see the value in return for their levy payment.
- Research is necessary for the future sustainability and improvements in farm businesses, allowing improvements through changing practice using science based evidence. Levy boards, Industry and Universities carry out extensive and on-going research, following research, resources are available to take the science and ‘translate’ into a practical guide and information for farmers. This makes the research real and transferrable. One could say that the UK could be seen to be disadvantaged by not having an independently funded centre for farm research, this would enable UK relevant results.
- Farmers are generally keen to learn and throughout my trip I found that that they are willing to travel for KT sessions where they see the value in attending. However a

number of UK farmers are known to travel to Ireland, New Zealand, America and various other countries to learn (where finances allow). But you cannot say this about all farmers, whether travelling local or overseas to learn, with each individual there is varying levels of self-motivation to learn.

- Challenges in the agricultural sector will always occur; the willingness of the sector to adapt and change will dictate whether they remain viable in business. Farm systems need to be resilient in challenging times, change and adapt accordingly to be sustainable, by engaging in KT to support any changes. Good practice and efficient practice should be encouraged at all times not just when the 'going gets tough!'
- This trip has further highlighted as a college how important it is to continue maintain and develop links with industry, levy boards etc, it is key to ensure KT is current and industry relevant for the student learners. It is imperative for students and their future employability prospects, students finish their course 'work' ready.

Concluding statement

I personally have gained a vast amount of experience, knowledge and understanding on the network of New Zealand KT in the agricultural sector. This includes the operational use of farms and on farm research as a learning tool for both students and farmers, of which will be put into practice. The contacts and links in New Zealand I have made are invaluable for any potential future trips and student exchange opportunities.

13 Acknowledgements

I would like to sincerely thank the The Farmers Club Charitable Trust for awarding me the scholarship to undertake the trip to New Zealand, it was interesting and inspiring and I have benefitted immensely, of which I will pass on to future learners.

I would also like to thank Reaseheath College for allowing me the time to plan and go on the research trip.

Finally I would like to thank the following persons, levy boards, industry contacts and Universities, their input was invaluable and I thank them all for taking the time to meet and speak with me. In the order of meetings they are the following;

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Susan Macky and Brian McKay, Dairy Production Systems Vet Group

Chris Glassey, DairyNZ, Lye and Scott research farms -

Tafi Manjala, Rabo Bank

Ale Vergara, Vet, sales technician, Alltech

Dairy Farmer Corey, Alltech Client

Greg Dyson, Super market owner

Katarina Knowles and team, DairyNZ, New Plymouth

Mohammad Siddique, Massey University, OneFarm

Eva Schroer-Merker and Natalie Bowie, Massey University, OneFarm connectivity Seminar

Russell Johnson, Beef farmer

Richard Wakelin, Farm Manager, Beef and Lamb New Zealand, Wellington

Victoria Westbrooke, Lincoln University

Ann Lee, Dairy Exporter Magazine

Rosie Petrowski, South Island Dairy Development Centre (SIDDC)

Ant Roberts, Ravensdown Fertiliser Cooperative Limited

Simon Sankey, Consulting Officer, DairyNZ, Christchurch

Andy (and Katy) Goodwin, Assistant herd manager

14 Appendices

1. DairyNZ, - The Five Production Systems definitions

System 1 - All grass self contained, all stock on the dairy platform. No feed is imported. No supplement fed to the herd except supplement harvested off the effective milking area and dry cows are not grazed off the effective milking area.

System 2 - Feed imported, either supplement or grazing off, fed to dry cows. Approx 4 - 14% of total feed is imported. Large variation in % as in high rainfall areas and cold climates such as Southland, most of the cows are wintered off.

System 3 - Feed imported to extend lactation (typically autumn feed) and for dry cows. Approx 10-20% of total feed is imported. Westland - feed to extend lactation may be imported in spring rather than autumn.

System 4 - Feed imported and used at both ends of lactation and for dry cows. Approx 20 - 30% of total feed is imported onto the farm.

System 5 - Imported feed used all year, throughout lactation & for dry cows. Approx 25 - 40% (but can be up to 55%) of total feed is imported.

*Note: Farms feeding 1-2kg of meal or grain per cow per day for most of the season will best fit in System 3. (www.dairynz.co.nz/farm/the-5-production-systems/)

2. OneFarm Connectivity Seminar Itinerary, 6th October 2015



Farm Management Connectivity Seminar

Social media, tools, knowledge transfer, decision making on farm

6th October, 10 am-3 pm, Rugby Institute, Palmerston North

Start time (Approx)	Agenda Item
9.30am	Morning tea
10.00-10.30	Introduction to the day Welcome and personal introductions
10.30-10.40	Overview on AgriOne and Centre for Excellence in Farm Business Management (CEFBM)
10.40-12.00	Interactive group session, online*. CEFBM: what you can get out of it, how to use and contribute
12.00-12.45	Lunch
12.45-2.15	Presentations and discussion: Lesley Innes / UK (knowledge transfer), Dave Gray (farmer decision making), Ben Groundwater (changing means of communication)
2.15-2.45	The way forward Brainstorm session on the challenges in dissemination of information to the right target groups and how we can best overcome these.
2.45-3.00	Conclusion and closing
3.00-3.30pm	Afternoon tea

*Wifi: "sportandrugby" with the password "IRANZ2012"