

Innovative disruption of farmer development programmes

A report for



**Nuffield Ireland
Farming Scholarships**

By Roberta McDonald
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Scholar Contact Details

Roberta McDonald

Bellair Est., Ballycumber, Co. Offaly, Ireland

Phone: 00353 861060943

Email: bellamcd1@hotmail.com

In submitting this report, the Scholar has agreed to Nuffield Ireland publishing this material in its edited form.

NUFFIELD IRELAND Contact Details

John Tyrrell

Executive Secretary, Nuffield Ireland

Phone: 00353 87 2563501

Email: exec@nuffield.ie

Executive Summary

Our agriculture and food environment is changing at a faster pace than ever before. Modern day technologies have broadened the access to information and people. We have greater transparency and communication, resulting in volatility in world commodity markets. The decisions farmers will need to make over the next decade will only become more challenging and heighten the need for ever-improving farm management. International studies have found that many technologies which would be financially beneficial to dairy farmers are not being adopted.

Our possible futures include the 'write-off' approach; where people who are not up to date with technology changes and improvements are laggards and will 'fall out' of the industry. This will result in larger farms and less people farming in rural areas. An alternative future- the 'reflective' approach; is much more inclusive where we, as an industry, examine farmer development programmes and ask ourselves have we tried everything? If we can work on disrupting the approach to farmer development programmes positively to be all-inclusive, does it have the potential to result in improved farm profitability where rural populations will also be maintained.

The future of people development needs to be disrupted by innovative means. Is it a workable people development framework for our future industry? This report will reflect on these questions and scratch the surface of adult learning specifically to do with farmer development programmes.

The main objective of this report is to innovatively *disrupt* the norms of farmer development programmes (public and private) by focussing on evaluation, adult-learning and communication to improve adoption practices

Leading from this over-arching objective this report aims to achieve the following:

1. Examine the process of adult-learning and the benefits of farmer-research-extension led programmes versus top-down knowledge transfer
2. Identify methods of measurement and benchmarking the quality of development programmes
3. Investigate the traits and skills required for an industry to improve overall farm profitability by including all relevant stakeholders in the process
4. Examine the future possibilities for development programmes within the agricultural industry and the role of private bodies in this

This report has been developed as a result of interviews, visits and practical demonstrations from experts throughout the world who are either practitioners, engagers or developers of farmer (and non-farmer) development programmes. These countries included Singapore, Indonesia, Japan, Israel, The Netherlands, USA (Washington, Illinois, Missouri, California), the UK, New Zealand and Ireland.

A number of recommended disruptions have been identified as a result of this report to engage and involve the people who are not already doing so. To start with, the term Knowledge Transfer (KT) should be banned from Irish vocabulary, it has already become obsolete in mainland Europe and in much of the southern hemisphere. As outlined in the report this term is out-dated and assumes that adult learning is via top-down approaches which is not the case.

Evaluation of farmer development programmes should include both quantitative and qualitative measures. Not all discussion groups are created equal. The fundamental finding from this report is

that we have lost focus on communication. Technical jargon and lecturing methods exist in spades. In a recent survey farmers were asked what they wanted most from someone advising them - their answer was someone with a personality and 'who I can talk to'. Farmer empowerment and ownership of their learning is essential to successful development and continuous improvement of development programmes. Farming families are the drivers of this change.

With growing urban populations, public funding for agriculture is on the decline. With many private bodies establishing development programmes for farmers this is a boost for their profile but in many instances it is also improving farms and people. Private funding will likely have an increasing role in the future. Ethically, as an industry, we need to ensure these programmes are actually improving farmers' personal development.

Innovative disruption is about thinking differently but to have a positive impact: in this case on farmer development programmes. The disruptive recommendations highlighted are focussed not on any one body or representative group such as researchers, advisors or farmers. It is in all of our interests to get involved in a culture change towards adult learning in farmer development programmes.

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Foreword

I am a daughter, sister, friend, runner, camogie player, and among other things I am passionate about the development of people, particularly in our dairy industry. In a rare circumstance, my parents manage a Dutch-owned dairy farm in the centre of Ireland for the past two decades. As an Animal Science graduate from UCD, I continued on to do my PhD with new entrant dairy farmers converted from beef, sheep and tillage throughout Ireland through Teagasc Moorepark, Cork. This is where my interest was piqued, as my study focussed on not just the financial and technical elements of converting to dairy, but also the decision-making behind it, how people learn and their propensity towards risk.

In Autumn 2013, I took on a role with Aurivo Co-op a multi-purpose, farmer-owned business in the west of Ireland. Dairy farms in the region need to be profitable if the coop and businesses around it are to be sustainable into the future. Following on from my research, I was tasked with coordinating the Aurivo Farm Profitability Programme which supports learning and upskilling for farmers in the region in collaboration with Teagasc, Animal Health Ireland and many other agricultural organisations. While we are by no means finished this task, we try to continuously learn and adapt the programme according to farmers' needs and involvement. The foundations of the programme, and what we do, are based on farmers' peer-to-peer learning. We aim to create an environment that promotes the empowerment and ownership of learning towards a more profitable business.

As a cooperative-funded programme we must reflect on our performance regularly through the level of impact, the effect on profitability, performance improvements and continuous feedback from the farmers themselves. I believe there is massive potential in our industry, not just because of weather or grass but because of the capabilities and ambitions of the farm families and people working in it.

Deciding on what countries to explore for my topic can be described as being like a child in a sweet shop: I wanted it all! As my topic is not necessarily rooted in the technical aspects of agriculture, other industries were also of interest to me. In the end I travelled myself to the UK, New Zealand, California and Missouri in pursuit of my study for this report.

My key driver in travelling to the UK was to meet with Dr Bryan Watters of the UK Defence Forces. Understanding change and how it is evaluated has been a major focus on the evolution of the British army from a pre-WWI nepotism driven selection of leaders from social standing to a current leadership development of those with the ability to lead and be followed. Similar to other countries you meet several organisations and people that are diamonds in the rough and realise they are excellent examples and end up driving your thoughts on the report but also in your wider approach to food and agriculture.

While we travelled through the US as a part of GFP I specifically went on to Missouri to explore the thought-process behind a 'radical' group of dairy farmers in the south-west of the state that had challenged the norms of intensive indoor dairy systems. Why this was interesting is that although many people challenged them on a grass-based system, they have surrounded themselves with positive people to find a solution and set out measurements to determine success - not basing it on social norms. California is the home of Dr Leslie Butler 'Bees', who was inspirational to this report, with an unquenchable passion for agriculture, change management and driving on an industry in a resource-challenged environment.

New Zealand was delightfully unavoidable. Prior to visiting the country I had lists of people recommended to visit from all of my previous travels that were located in New Zealand. There was a lot to see, understand and investigate in relation to their approach to agriculture, people and respect for social sciences parallel to technical knowledge. It did not disappoint; with reams of notes, and hours and hours of interview recordings.

As a part of the GFP, the countries visited as a group of 11, included Singapore, Indonesia, Japan, Israel, the Netherlands, and the USA (Washington DC and Illinois). By travelling to such diverse countries it was easy to identify with useful information and stimulating debate within each country, from how an innovative start-up measures their success to an individual developing their own farm business. The people along the way in each country are the basis for this report. This report has led on to more questions than answers in some respects. I would have liked to keep travelling to different countries and meeting these inspirational people, but unfortunately, due to time restrictions and limited resources, I will have to postpone those travels to a later date.

Acknowledgements

I am very proud to have been offered the Nuffield Farming Scholarship and wanted to use it to drive our industry even further through our greatest resource - our people. My report is focussed on people development in agriculture and how we can capture this strength to create an attractive and vibrant future for our industry. We cannot become complacent about our futures, and to improve, we must change and adapt to conditions.

My employers, Aurivo Co-operative Society, have been instrumental in my Nuffield journey as part-funders of the scholarship fund and supporting my travels over the past two years.

To the many unofficial mentors and role models including Brendan, Matt, Karen, Karina, Bill, Grace and my Dad, Ciaran, to name but a few who have been inspirational to me on my journey through this scholarship, and will continue to be long-after I have it done. Thank you for the phone calls, chats and inspirational quotes, books and Ted Talks along the way. To my official mentor Mary Webb, thank you for your constant support over the two years - it was a pleasure getting to know you.

Thank you to my family, Mam, Dad, Triona, Chris and of course Millie, who kept me grounded on this journey and were always ready to discuss ideas at the kitchen table, but always a source of a laugh when you needed it most! Thanks also to my friends at home and abroad for your support - even if you didn't know it, your motivation and positivity always help drive me on.

Only for Nuffield I would not have met the wonderful people that change your way of thinking and give you the confidence to disrupt the norms. Thank you for this fantastic opportunity.

Abbreviations

AHDB- Agriculture and Horticulture Development Board (UK)

AIS- Agriculture Innovation Systems

BNIM- Biographic Narrative Interpretative Method

CO's- Consulting Officers

CSR- Corporate Social Responsibility

DAFM- Department of Agriculture Food and the Marine

DWN- Dairy Womens Network

ePM- eProfit Monitor

EU- European Union

GFP- Global Focus Programme

ICOS- Irish Cooperative Organisation Society

KASA- Knowledge Attitude Skills Aspirations

KT- Knowledge Transfer

LUDF- Lincoln University Dairy Farm

MFAS- Monsanto Farm Agvisory Services

NZ- New Zealand

PAR- Participatory Action Research

PR- Public Relations

ROI- Return on Investment

SIDDC- South Island Dairy Development Centre

TOP- Targeting Outcomes of Programmes

UCD- University College Dublin

US or USA- United States or United States of America

UK- United Kingdom

WW1- World War One

Objectives

The main objective of this report is to innovatively *disrupt* the norms of farmer development programmes (public and private) by focussing on evaluation, adult-learning and communication to improve adoption practices

Leading from this over-arching objective this report aims to achieve the following:

1. Examine the process of adult-learning and the benefits of farmer-research-extension led programmes versus top-down knowledge transfer
2. Identify methods of measurement and benchmarking the quality of development programmes
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Introduction

Today's world has a cacophony of information, instant communications, real-time market movements while videos, pictures and social media tell the most personal of information. There are many advantages with this, and for our agriculture and food industries it has meant transparency, reporting and a greater ability to market our products. In contrast, today's technologies also mean that we have greater volatility in world commodity markets, in which consumers and celebrities interact publicly about food choices and animal welfare. Our agriculture and food environment is changing at a faster pace than ever before.

“Change is the law of life. And those who look only to the past or present are certain to miss the future – JFK”

There is a belief that some farmers who have survived this long through not adopting best practice or improved management, so why will the future be any different for them. The decisions farmers will need to make over the next decade will only become more challenging and heighten the need for ever-improving farm management, requiring the benefits of nationally coordinated research, development and extension systems to cater for the dissemination of such technologies and information (Paine et al., 2002). International studies have found that many technologies which would be financially beneficial to dairy farmers are not being adopted.

There are options:

- A. We (the industry) write off those people who are not changing and improving. They are the 'laggards' or 'slow adopters'. If they haven't caught-on now they never will. In the future these farms will be bought by larger farms and less people will live and work in rural areas

Or

- B. We (the industry) take a step back for self-reflection. Evaluate how we are teaching, examine how best practice technologies are promoted, take account of adult-learning styles, and ask ourselves have we done everything we can do? Yes some farms will still go on the market, farms will get bigger. We may be able to maintain a population in rural areas, people will remember where food comes from, and there will be more careers available in farming.

The future of people development needs to be examined. Is it a workable development framework for our future industry? Where will funding come from and how do we adapt? Whose responsibility is it to disrupt and change?

Innovative disruption is a term used in business and marketing circles. It is a means of challenging the norms of the environment by thinking and acting differently- breaking the rules and becoming a leader. Ireland have done this within technical agriculture for a long time- how about changing the focus to the people of our industry next. An example of this would be Netflix, they targeted a low profit market at first and were able to experiment and build under the radar from Blockbuster. Harvard Business define 'Innovative disruption' as a descriptor for when a new idea or business comes in to challenge the markets of established companies by looking at things differently and winning business through largely overlooked segments of the market. In other words turning non-consumers into consumers.

This report will reflect on these questions and scratch the surface of adult learning specifically to do with farmer development programmes. The main objective of this report is: to innovatively disrupt the norms of farmer development programmes in order to create a vibrant, challenging and worthwhile learning environment for farmers of the future. To achieve the reports objective the examination of farmer development programmes will reflect on: quantity vs quality measurements of learning; the role of good communication; farmer ownership in such programmes; and examining the consequences of private industry involvement.

When we count the number of cows in a field what does it tell us? It tells us the number of cows... not their condition, characteristics or health status! We can look at our national and international development programmes in a similar way. If I count 100 farmers at a farm walk- what does that tell us? Yet this is how we normally rate the success of advisory and development programmes. Maybe instead of the number of people, we will count how many days they met or how many hours the meeting took. But do we know what was learned? How many people went home to take an action or change what they are doing? How do you measure without numbers? This question lies within the bounds of qualitative research and theory. Quantitative data is something many people feel more comfortable with, particularly in a technical industry. Quantitative data includes numbers, counting, percentages and totals. While qualitative data includes opinions, suggestions, conversations, theories and ideas (see Table 1 below). Not very easy to compare, benchmarkor for the purpose of this report- to measure. "Economists have come to feel, What can't be measured isn't real. The truth is always an amount, Count numbers, only numbers count" (Chambers, 1997).

Table 1 Examples of quantitative and qualitative data

<i>Quantitative measurements</i>	<i>Qualitative measurements</i>
<i>Attendance</i>	<i>Farmer involvement in discussion</i>
<i>Frequency of events</i>	<i>Level of improvement or understanding</i>
<i>Test results</i>	<i>Farmer empowerment/ownership</i>
<i>Potency of advertisement</i>	<i>Action or change taken post event</i>

If this report were to focus on the quantifiable facts of existing development programmes it demonstrates that in Ireland there are estimated to be 18,000 dairy farms, 60,000 beef farms and 32,000 sheep farms (Beehan, 2012). Of those farmers who connect with locally run discussion groups 28% of dairy farmers participate, while 10% of beef and sheep farmers are in discussion groups. It cannot be denied that improvement is required to get more farming families connecting with extension and peer-to-peer learning.

When you look at the actual uptake of technologies associated with improving farm profitability there are less than 18% of dairy farmers measuring grass (Creighton, 2010). Almost 9% of dairy farms have completed the national financial management tool, Profit Monitor, 0.1% of beef farmers, and less than 0.5% of sheep farmers have done so (ePM, 2015). Farmer decision-making is a much studied and published topic. The answer to whether learning takes place after a farm event is rarely associated with just one moment but rather several moments with several key influencers.

There are a multitude of upskilling events, farm walks, well-publicised open days and the number of meetings held by discussion groups through various European funded initiatives over the years. However, what are we actually measuring here- bums on seats? This data tells us that there are a lot

of sources for learning but that they are not always leading to improved farm management- bringing the focus back to the question of quality versus quantity. Are all groups created equal?

National studies in Ireland have investigated the role of the farm advisor and the demands of their clients, the farmers. One such study asked farm advisors what they felt was most important to keep farmers interested in learning- their answer was technical knowledge and advice. Another study asked farmers what they felt was most important for an advisor to have- their answer was someone who can communicate (Teagasc/UCD Masters in Innovation, 2016). Dairy NZ, a New Zealand research and advisory body, interview potential advisors by having them facilitate a mock discussion group with real farmers on a real farm. The farmers themselves give feedback. The feedback is based on the person's ability to communicate and their personality in doing so. The concept here is that you can always teach technical knowledge, but it's more difficult to teach 'good' communication.

NZ scholar Tafi Manjala (2014) focussed on transforming extension programmes for farmers from good-to- great. He recognised the importance of keeping farmers in the 'driving seat' of extension activities. So in this debate who is it at fault for not having farmers in the driving seat- the farmers themselves or the institutions 'transferring' the knowledge? The importance of empowerment and farmer leadership in their own learning is essential to successful personal development and development programmes. NZ scholar Ben Allomes (2016), concluded in his Nuffield report that self-awareness and self-reflection were identified in people who were willing to take on leadership roles in their communities.

Private industry is getting increasingly involved in farmer development programmes, from Rabobank's *Farmer Master Class* to Monsanto's *Farm AgVisory Services (MFAS)* in developing countries, and many more. When asked why these organisations are getting involved, the usual response is about the welfare of local people or improvement of farmers for the greater good. What is also happening in the background is an increasing pressure on international organisations to fulfil their Corporate Social Responsibility or CSR. In addition, it is good PR to be promoting such programmes and is an extra 'bow' to potential customers if there is a story in the background. In contrast, public funding for agriculture and farmers' development is not increasing in the world, primary example within Europe as the UK leave the EU. Private industries are also doing a lot of good by establishing programmes that are well-resourced and often quite innovative. They are set-up with a 'return-on-investment (ROI)' in mind, while public organisations may not always have such strict answerability or pressure for ROI.

There are many elements to the future sustainability of agriculture and food production in the world. This report emphasises the role of upskilling and personal development and what factors influence its success for farmers around the world. What can we do more of (or less) here in Ireland to encourage innovation, independent and critical thinking amongst farmers to home-grow future leaders and to promote ownership of self-improvement to ensure a vibrant industry into the future.

Methodology

The primary methods of investigation used for this report included group and one-to-one interviews in person, over the phone and via Skype. The research interviews carried out were loosely based on open-interview styles like BNIM (Biographic Narrative Interpretive Method). This method encourages the interviewee to talk about what they find most important and follow-up questions are based on what they say. This is in contrast to a questioning format which steers the discussion towards the interviewer's idea of what is most important.

Particular focus to interview members of industries that have well-structured methods of evaluation such as Dairy NZ and the British army. Also to investigate the landscape of an agricultural industry in the cusp of great change such as AHDB in the UK and in contrast an industry who describes itself on the other end of the spectrum of evolution; the Californian dairy industry. In addition the interviews varied amongst practitioners, farmers, extension 'activists', researchers and professionals from private and academic industries.

1. Farmer Learning and Communication

For the purpose of this study 'development programmes' for farmers are defined as any event aimed at developing technical, management or leadership skills in the farming community. Encompassing discussion groups, farm walks, workshops, short-term courses and collaborative programmes.

Why does learning happen?

Millar and Curtis (1997) found that farmer knowledge can remain dormant in groups unless social interaction takes place. A social environment facilitates farmer interaction and allows the comparison of ideas, on how to apply information to their own situations and gauge other people's attitudes to potential change (Kilpatrick, 1999). The process of sharing experiences and collectively solving problems, highlights the importance of local knowledge. The knowledge gained from other farmers is a source of valuable information, as it is coming directly from experiences and observations over time. Other farmers and family members bear a great influence over a farmers decision-making process, and are often consulted numerous times during this process (Millar and Curtis, 1997). As well as learning from other people, farmers also rely on their own past experiences both on-farm and off. Innovative and successful farmers are becoming more aware of obtaining the necessary information from the correct sources (Kilpatrick, 1999). Farmer knowledge originating from direct experience and observations is often bound by a specific situation where it is difficult to apply to a wider context of problems (Kloppenburg, 1991).



Picture 1 Farm workshop with Dairy NZ taking place outside of Rotorua, North Island

How learning occurs?

Support networks are difficult to establish due to the isolation of those working alone or in small teams, but support systems and learning networks can be formed through organised training and educational events (Kilpatrick, 1996). Interaction with other producers is an important aspect of how

most farmers learn. Stephens (1998), claimed that producers working together to solve problems would work out more effectively than if those producers were to work in isolation

The two main sources of learning for farmers are categorised as 'formal' and 'non-formal'. Formal learning is defined as structured courses through educational facilities (Bamberg et al., 1997). Non-formal learning sources for farmers include experts, other farmers, the media, experience and observations, farmer-directed groups, field-days, seminars and conferences.

a. *Formal Learning:*

Formal learning such as training events and education do not initialize change, however Kilpatrick (1996) found that they do motivate the farming community to seek improvement through change. Formal qualifications and education were seen as a prerequisite for new entrants into farming but in contrast perceived as an unreliable method in educating existing farmers (Kilpatrick, 1996). According to Kilpatrick and Rosenblatt (1998), farmers prefer less formal learning due to its self-sufficiency, independence and a lack of confidence in formal educational settings. At a national level examples include, certified courses through ICOS, the Green Cert and diplomas from agricultural colleges.

b. *Non-Formal Learning:*

Reeve and Black (1998) identified farmer-directed discussion groups as the greatest motivators for change. Discussion groups in Ireland first existed throughout the 80's and 90's but became more prominent through government paid initiatives in 2010 (DAFM, Accessed September 2017).

Scientific knowledge is restricted by its reductive and theoretical nature in which scientific fact is capable of overcoming local context (Kloppenburg, 1991). However, in a group context where farmers come together with an extension agent or scientist, the interchange of knowledge has a symbiotic effect, allowing local knowledge to adapt and broaden with scientific knowledge. This results in a more successful outcome than if each knowledge system were to remain independent of one another (Millar and Curtis, 1997). Curtis (1997) noted that farmers who were members of discussion groups had higher levels of computer-ownership, and were more likely to use them for financial management practices related to the farm business.

Field-days, farmer-directed groups and seminars which provide hands-on learning experiences are welcomed by the farming community as sources of practical information (Kilpatrick, 1999). Field-days have high rates of participation and are often very successful methods of transferring data to farmers from the scientific community (Kilpatrick and Rosenblatt, 1998). Kilpatrick (1996) observed that in a given year only 3% of farm businesses had someone participate in a training day whereas 76% attended field days.

Case Study- British Army: Developing Influencers instead of Commanders

Dr Bryan Watters, of Cranfield University, is a Director and lecturer in Defence Leadership and Strategic Leadership. Dr Watters has served with the British army all over the world including Bosnia, Iraq and Kosovo. So what is the strategy for managing change in the military? According to Dr Watters leadership and influence originates from the army, the government and the church. These are institutions that have led masses of people- what can we learn from them.

Today there are over 82,000 people in the British army- why are they doing this job, are they getting paid enough to risk their own lives? Probably not. Enforced leadership versus voluntary leadership was taken more seriously during WW1 when all of the commanding officers (from wealthy families) were killed in first few weeks. They needed other leaders from other backgrounds that didn't necessarily have wealth or a family name to ensure a hierarchy. People had to learn to influence and not just command.

Leadership theory has also come from the industrial revolution and what has become of managing change and boosting production. A researcher during the Industrial revolution looked at what increased production in relation to the environment. He found changes to light, and temperature increased productivity. When the staff were asked why light and temperature made such a difference they said they had never been asked before what conditions they wanted and when they saw that their bosses cared for them they wanted the experiment to work so they increased production whenever they were measured. This has highlighted a number of points 1. That measuring only shows results of the measurement! And 2. That when people are looked after they transformed from workers into followers.

When discussing change and peoples motivation towards change Dr Watters has found that many people in hierarchical positions make a change and cement it prior to any other steps. The Kurt Lewin model for change highlights the importance of a lead-in to making change successfully happen.

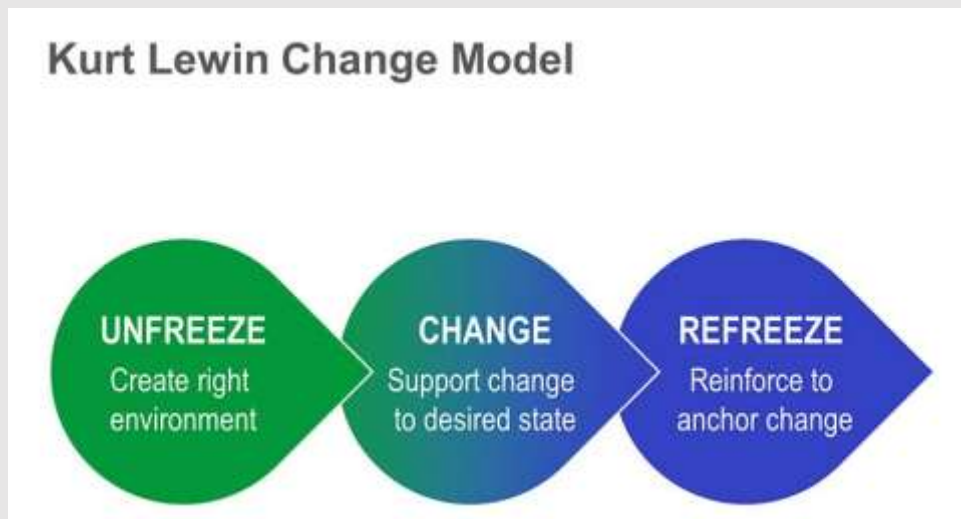


Figure 1 Kurt Lewin Change Model identifying the states required for change

Influential People

An Irish study found that farmers formed their future intentions and plans largely around whether or not they had a family member to take on the farm (O'Donnell, 2008). Similar findings were also observed in the United Kingdom, Germany and Portugal (Sottomayor et al., 2011). Farming families are unusual in that they are capable of coming together as a collective working unit engaged in production whereby mature children often continue to work with their parents; not a typical nuclear family system (Hutson, 1987). In family farms, several factors and people can have an influence on the decision-making and management of the business. Farman-Bowers (2007) found, in a study of farming families, that they are capable of creating opportunities for themselves to take action or control and make strategic decisions to lead to major change in the families future.

Previous studies highlight that when making decisions, farmers take into account what other people, including other farmers, think and do (Cooke et al., 2001). The commercial application of AI now spans 75 years and is widely used by dairy farmers and is perceived to be a successful and economical method of generating improved progeny for the dairy herd (Vishwanath, 2003). In contrast, grassland budgeting is a relatively new technology (O'Donovan et al., 2002) and has not been widely adopted by dairy farmers.

'Role models' or 'opinion leaders' used strategically by extension services to encourage the diffusion of technologies and the adoption of farm production and management innovations can be effective. The objective of identifying 'role models' is to lead by example to encourage behaviour change amongst other farmers. Programmes that have utilised 'role models' among farmers have demonstrated greater success in achieving their objectives than those that have not (Valente and Pumpuang, 2007). However, this must be done so with caution as previous studies have found that an aggressive approach to identifying 'role models' can hamper the impact on other farms. The danger is identifying 'role models' that are not recognised as such by other farmers- only by the extension agents themselves. 'Role models' recognised by farmers can be innovative leaders who use the strategies promoted by extension agencies and can equally be those who oppose what is promoted by extension agencies (Rogers, 2003). Critically, Rogers (2003) claims that opinion leaders must reflect the norms of their peers' social groups in order to maintain their leadership status. In circumstances where extension agencies target and use 'role models' on the basis that their behaviours are compatible with the agencies' aims, the 'role models' can ultimately transpire to have little credibility among farmers. Contrary to the ultimate aims of extension agencies, 'role models' who have existing credibility with the farming community and are leveraged by extension agencies to promote particular practices can, as a result of developing an excessively strong association with the agency, diminish their 'role model' status within the community (Rogers, 2003). Furthermore, when 'role models' who would have previously taken a personalised approach to advising farmers are utilised to promote larger-scale technological blueprints specifically, they can lose their effectiveness in encouraging farmers to make more incremental changes to their farm production and management techniques. 'Role models' assisting farmers in localised contexts can encourage achievable and customised change on farms, not just the adoption of new blueprints and technologies (Rogers, 2003, Valente and Pumpuang, 2007).

Case Study- Dairy NZ: Identifying role models and key influencers



Picture 2 Husband & Wife team explaining their experiences with Once-a-day milking at a Dairy NZ farm walk

In Dairy NZ considerable research and resources were put into a project looking at how farmers are influenced in modern day New Zealand dairy farming. Led by former Dairy NZ manager Ian Tainibotton and his team, the project objective was to identify the key role models in certain areas and find out how farmers are learning from each other as a result. Face-to-face interviews and follow up meetings were

used to carry out the research on 10-15% of the population in the NZ regional areas. To compliment Phillips 1984 research the people mentioned through interviews were categorised as intimates, acquaintances, or paid experts accordingly (see Phillips diagram of influence below).

As Dairy NZ knowledge systems are primarily based on farmer-to-farmer learning this was hoped to be a key to understanding the key influencers and how they had become so. The interviews were carried out with the husband and wife or partnership team not just one person from the farm. The team identified who the decision-makers were by topics and this helped identify the categories each person looked after. After establishing the context of decision-making within the house a map was drawn of all the people who influence certain topics e.g. for pasture management the husband was the decision-maker and was able to identify local farmers and consultants who were most influential on his decisions in the area.

This research identified key influencers and these were often not who the team had expected. Rarely the 'top' farmers or political farmers were identified as key influencers. Steering groups for research and knowledge in regional areas became more diverse to represent more of the less traditional influencers. One case was a farming couple who were mentioned multiple times by people in the area. Local farmers would ring the household number to speak with the husband about various management issues but over time his wife actually became the key influencer because she was answering the phone and people then went to her for advice instead.

A key outcome of the project Dairy Connect was set-up. This is a regionally based online forum that helps link people who have made various decisions on their farms and are willing to offer their advice and story about how they achieved it and put in contact with the person seeking advice. This is rotated regularly to prevent exhausting the same farmers for topics. The project itself was intensive to carry out and has been described as having a "sell-by-date" as people who are influential can change over time for different reasons, physical or emotional. What this does show is the complexity of farmer-decision-making and that it is rarely a result of one person or source but several.

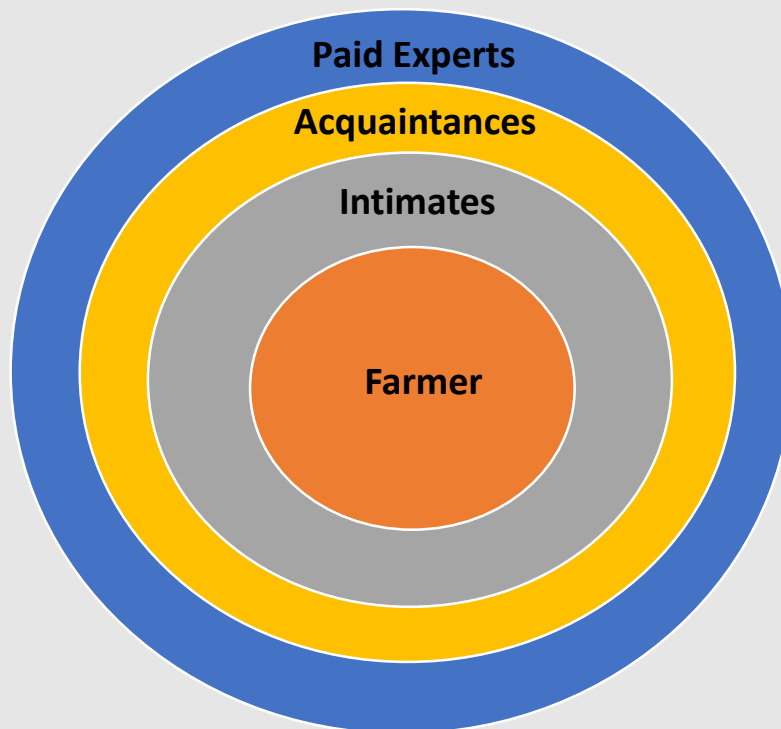


Figure 2 Tom Phillips 1984 thesis explaining the relationships farmers have with multiple forms of influencers in order to make a decision

Case Study- New Zealand: Lincoln University Dairy Farm

Lincoln University Dairy Farm (LUDF) is a 186 hectare irrigated property, of which 160 hectares is the milking platform, it is a former University sheep farm. Converted to dairying in 2001, the dairy farm is managed by the South Island Dairying Development Centre (SIDDC). The purpose of the farm is for both research and demonstration – trialling concepts for potential commercial use (www.lincoln.ac.nz Accessed March 2017).

Adrain van Bysterveldt was the local extension officer for Dairy NZ in the early years of the farms set-up. LUDF was steered and established by a group of experts and local farmers to identify key issues effecting farms in the Canterbury region. Adrian describes the farms role as tackling issues like every farm had but articulated the problem in a different way to help people- “We found the Lincoln problem, and said we would address it then bring farmers along for the spin!”. As with many similar projects there was initial scepticism and plenty of mistakes made early on. Addressing issues that everyone else was facing helped with farmer engagement, also by keeping information transparent and telling the good news with the bad.

Cow-related issues were always the easiest way of getting farmers attention, grass and systems-based problems were harder to convince people on. Heifers ended up being an issue for the farm, they found that they were entering the herd with high cell counts and mastitis problems. So to present this problem they had a large open day, and to build up to what was happening they outlined current research and best practice guides for managing mastitis as well as the cost of those guides on time

and money. They decided to choose one option- teat-spraying heifers three times per week prior to calving. The end result was a 50% reduction in mastitis and this was presented at another open day. LUDF were disappointed with this result and decided they needed to do something else. They decided to teat-seal heifers prior to calving instead, still a cheap and practical option. The result was a 95% reduction in heifer mastitis.

Farmers were intrigued because this was new and had a high success rate. The practice was repeated the following year with the LUDF heifers before calving season with the same results. The regional body selling the teat seal reported an “unbelievable explosion” in sales of teat seal and even ran out of product in low

“It had a major impact for being clear and being specific about a problem caused change. It was change to a small part about how they do things.” Another point made by Adrian is that this practice dealt with a fundamental unhappiness farmers had with heifers calving down with mastitis, the motivation for change was not only cow health but farmer happiness. The success of teat seal use on heifers was also related to the fact that heifers were synchronised to calve down together. Inadvertently this was also being promoted and together these practices actually helped time management and the workload of farmers over the calving period.

The key learnings here were that farmers were interested in instant results more so than the 10 year issue that takes time to come about. The LUDF team also found that having local champions of the



farms and early adopting farmers who engaged with them regularly helped promote their messages and improved validity and trust in the farm. Farmers learned through the focus, simplicity and practical evidence and changed their own methods of management as a result.

Figure 3 Pyramid of Intervention from discussion with Andy MacFarlane February 2017

2. Farmer Ownership and Involvement

Is Knowledge Transfer outdated?



Figure 4 If only 'knowledge transfer' was as easy as this...no need for communication, change readiness or methods of explanation

The term 'Knowledge Transfer' doesn't fully encompass adult learning, peer-to-peer learning, independent and critical thinking and application to your own unique situation. Previous research states that extension has transferred from a model of technology transfer or a 'top-down' approach towards the promotion of change through farmer learning and personal development (Paine and Kenny, 2002).

Modern thinking on the process of learning in rural areas is evolving from a pipeline approach of the researcher-telling-the-advisor-telling-the-farmers to an innovative systems approach where learning and innovation are a result of networking and discussion with peers and experts in multiple disciplines. The original 'research-push' approach (Technology Transfer/ Diffusion of Innovations) has become outdated and replaced with a 'research-pull' and

collaboration approach referred to as agricultural innovation systems (AIS). This is an understanding that adopting new technologies invented by research and transferred to farmers is not enough to be innovative, but takes account of labour, markets, land and other moving parts associated with the farm business (Klerkx, 2013).

This broader sense of farmers and their businesses does not allow for linear-thinking or encourage a belief that a new technology can solve an issue that might be caused by multiple internal and external factors.

The process known as the Diffusion of Innovation (see below) and beliefs around the transfer of technology originated in the 1960's and encouraged a linear approach to extension. In this context farmers are considered 'adopters' or 'laggards' and the result is to cause a change in farmer behaviour. The modern twist on information systems developed in the 1990's and 2000's is collaborative from research levels right through to extension and involves many actors within the industry. Here farmers are partners, experimenters, innovators and the ultimate result is farmer empowerment and ability to be flexible and innovate accordingly.

NZ based private consultant Andy MacFarlane has worked in agriculture for a number of years, and asks- Why is everyone obsessed with the Diffusion of Innovation? (MacFarlane, 2017). Is it possible that those who have not yet taken up a technology to improve their business are made up of two types of people?

1. Have the skills but not the confidence
2. Have the confidence but not the skills

In contrast Dutch based researcher Klerkx, questions the role of forcing technologies as a true measure of success on farms or for development programmes. Should the goal not be to empower people to learn and adapt themselves to business rather than a 'one-size-fits-all' approach?

The diffusion of innovation

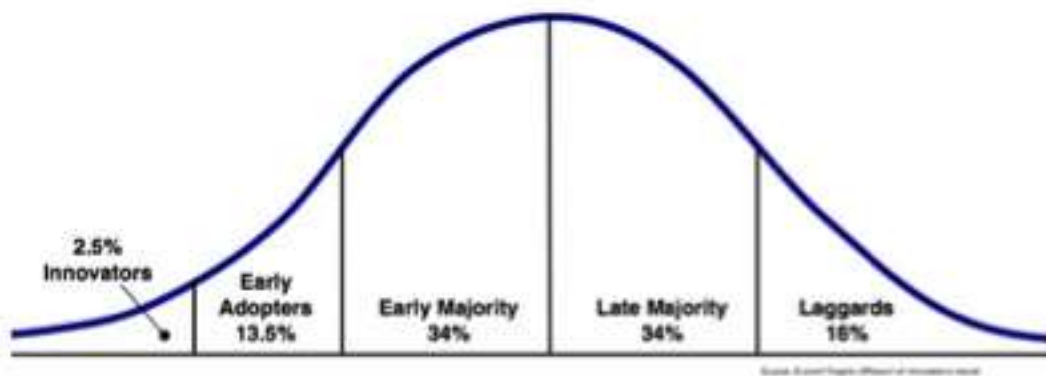


Figure 5 Rogers summation of the stages in how people learn



Picture 3 Green Tea farming in the mountains of southern Japan. Knowledge is passed down through family on how to harvest and manage their tea trees

Decision-making

Non-economic determinants such as values, tradition and sources of knowledge are some of the key social principles associated with decision-making for farmers (Vanclay, 2004). The adoption or diffusion of a new technology is often difficult to transcend, even when the technology has obvious

advantages (Rogers, 2003). Adoption of new ideas or technologies does not occur in an isolated context, but with farmers discussing their ideas with other farmers, or by the concept that to adopt would be 'good farm practice' (Vanclay, 2004). Indeed, Vanclay (2004) demonstrates that on-farm decision-making is a social and culturally entwined result of farmers dealing with external issues affecting them. The decision to adopt a new technology is not a casual response to the information provided by scientists or extension agents, but a calculated judgement after considering the potential repercussions for the farm business (Vanclay, 2004). Effective farm management and improvement is based on the level of technology exchange, while adopting appropriate new technologies in a timely fashion (Altham and Guerin, 1999). Adopting a particular technology or innovation occurs through a specific process from learning about the technology through to its actual implementation and use. Based on the psychological Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980) it is proposed that a person's attitudes toward a new innovation or technology plays an important role in determining their behaviour towards it (Flett et al., 2004).

Paine et al. (2004) and Nettle et al. (2010) suggest that future research, extension and education initiatives should be tailored to, and potentially co-designed by, farmers to increase participation in and awareness of the benefits of such initiatives to farm profitability. Although many studies are concerned with the economic reasoning in decision-making by the farmer, they do not fully capture the complexity of a farmer's motivation and behaviour (Gartrell and Gartrell, 1985, Turvey, 1991). Murphy et al. (2013) observed that the changing needs of farmers and the scarce availability of resources will require the collaboration of scientists, extension agents and farmers to overcome these challenges. Current research in Australia is already incorporating farmers through Participatory Action Research (PAR) designed to gain a better understanding of peer-to-peer relationships (O'Kane et al., 2008) or alternatively to examine the effectiveness of extension through the eyes of the farmer as a learner.

Case Study- Missouri: Farmers learning from Farmers



Picture 4 Discussion group meeting on one of the Grasslands farms in Missouri. Critical discussion on managing native grasses and weeds taking place here

This is where a like-minded melting pot of Irish, NZ, and US dairy farmers decide to produce milk on grass based systems. Highest temperatures can be up to 41 C in summer and -23 C in Winter with c1000ml rainfall in the year. The only sheds on these farms are milking parlours, or rundown shells of barns from decades before. Most are running seasonal Spring calving seasons while others are split calving.

It is only in the past 20 years that grass-based systems have taken off in this area so its an extremely exciting environment to work in. This close community of dairy farmers are working together with the local university to suss out best

practice and new management techniques to improve efficiencies further. It seems each farmer I met has been carrying out their own form of research over the year. From cow type to forage there doesn't seem to be a consensus on what works just yet. One thing is for certain though- these people are determined to make grass systems work and the focus is continuously on profitability.

Professor Stacey Hamilton of the University of Missouri, explained that the grassland dairy research farm closed down recently and has led to localised trials on grass varieties, irrigation and reproduction not being carried out. Thanks to the progressive minds and comradery of the area however, local farmers are very supportive of on-farm research and work closely with Stacey and his team to run the trials at a commercial level for the time being.

At a discussion group meeting the main topic of conversation was weeds. There are an assortment of trespassers spotted around the paddocks mainly native to the area. Although many of the NZ owned farms are going on a 100% ryegrass operation many of the local farmers are trying to grow fescues, cocksfoot, forage alfalfa, and a multitude of forage 'weed' grasses. There are a number of reasons for this:

- 1. To have more days grazing these non-ryegrass swards can stand up to the weather slightly better.*
- 2. To prolong the lifetime of the sward as these grasses can withstand local weeds slightly better (tight grazing of ryegrass suits the local weeds because it creates openness in the sward)*
- 3. The processor pays on volume and fat % not protein.*

The NZ company set up dairy farms in the area about a decade ago and are now milking over 7000 cows on 12 farms with manager, contract milking and share-farming models in place. The aim is to get to over 12000 cows in the next 5 years – but to do so on a low cost and extremely efficient system. They believe there is still massive potential in what they already have- as well as new operations to be established in the future. Their ethos is based around a simple system that relies on 100% ryegrass pasture with some supplementation at the shoulders and during the extreme summer months where drought is hard on the ryegrass. These farms, like many of the local dairy farmers, supply the massive cooperative Dairy Farmers of America.

Much of the grassland, fescue, alfalfa or ryegrass needs to be reseeded every 3-5 years as local, aggressive weeds take over like Bermuda, crab grass and goose grass. The latter are annual weeds which poach the fertiliser and moisture meant for the nutritional grass. Bermuda is a different story, it has small buds in the soil that will keep coming back every year once it's become established. Reseeding is a working capital cost on these farms and budgets are for up to 25% reseeding every year (€70-95/acre). Average supplementation on local farms is from 1.5 ton/head + while some farms are achieving under 1ton/head. All farmers admit that management of the grassland over here is where most of their gains have been over the years.

Land use is mainly extremely lowly stocked horse or beef farms with overgrown meadows. Land 10 years ago was around €1500/acre while today it is just over €2500/acre. The potential is enormous should anyone take on the challenge.

Empowering People

Our current system of farmer feedback on development programmes is to include and discuss with the 'top farmers' and discussion groups in the country. This promotes innovative research and staying ahead of the curve. In some ways, it also establishes buy-in from others as these potential influencers

and rural leaders may be encouraging best practice 'by doing'. In contrast, these farmers could also be so far removed from what an 'average farmer' believes they can (or want) to achieve and so are not really leading or influencing very much change or development. To encourage ownership in learning and involve farmers in the process we must find a way to get all parties involved. These 'top farmers' are essential to development of new practices, identifying key issues for the future, but so are others. The 'average farmer' has a key role in how all of this new research and practices are communicated.

'Top farmers= important for innovation; Average farmers=important for communication'

In Australia, it has been common practice to involve farming families in the process of research and communication development to improve farm profitability. The methods used include Participatory Action Research (PAR).

Case Study- Dairy Women's Network, NZ: Owing Learning

The NZ based Dairy Women's Network exist for local women and has been set-up by local women. Dairy Women's Network is an industry funded not-for-profit organisation providing a service to support rural women involved in dairying with everything from financial planning to social networking. Their role is to support and empower women to help themselves. For some it was learning how to use a chainsaw, for others its more confidence working on a business plan. But what it creates most of all is a social group who can talk to each other, learn from one another. Everyone grows and takes ownership for their own learning and development.

Importantly this organisation is funded by sponsorship from the industry- the industry have acknowledged the power behind supporting the farm FAMILY not just the one member. Dairy Women's Network (DWN) are part of the national Dairy NZ strategy to give women a voice. The industry believe women are the change-makers on farm.

The original group of women set-up the organisation after attending an American Women in Agriculture conference and from there women developed themselves and trained to become coaches and facilitators to support local female only discussion groups. There are now 37 different DWN groups throughout New Zealand. Rural professional women also get involved to support new groups set-up and train in the members in leadership and facilitation to encourage ownership. The members drive the agenda and hence the reason there was a chainsaw skills event- a number of women wanted to learn...and so they did.

Overall 9,200 women are members of the groups and 60% are farm owners in partnership, while the remainder are working in collaborative arrangements on dairy farms. With a high level of commercial investment from the wider agricultural industry, companies see their involvement in DWN as a way of meeting the key financial decision-makers on dairy farmers in New Zealand. It is this belief that has been portrayed by women in agriculture that now allows them to keep driving each other on and take ownership for their own learning.



Picture 5 Young farmers group come together to package and sell rice in Japan. Taking it upon themselves to encourage more young people into farming through radio shows and podcasts.

Case Study- California: When farmers are not involved

From c.20,000 farms over 20 years ago there are now 1,600 dairy farms left in California, albeit larger scale. Cow numbers in the state hasn't changed in 15 years- so numbers aren't decreasing just numbers of farms. This is the story we hear worldwide- larger scale with less farms...but at what cost? Is California dairying the future landscape of dairy farming globally?

The dairy system in California is completely based on imported feed, milk volume and very large scale. Herd average is getting closer to 1,200 cows now. Dr Leslie 'Bees' Butler and his team in the University of Davis, California explained the Californian dairy landscape at length. They found it difficult to define a dairy farm; farms are now becoming part of large groups of farms. When family farmers leave the industry the corporate companies (originally farmers) are buying up the space. There are 10-12 farm groups currently (along with many single farm ownership) and they estimate that in the next decade it will be about 20 groups that will own 95% of farms in the state. Due to milk price volatility smaller scale (less than 1,000 cows) farmers are still leaving the industry. The benefits of having a farm group of up to 30,000 cows is that you have economies of scale. These farms have people dedicated to feed purchasing, watching markets, buying bulk and getting better prices. Spreading 30,000 cows across several blocks means you don't deal with public perception issues of a single 30,000 cow farm.

So does this mean that naturally the top guys remain? Are these the extremity of Rogers bell curve of innovators- or the Top 10%. These men are key to extension / farm advisory in the state. 20 years ago they ran workshops and field days many times per year- today there is nothing. Farmers don't go anymore. A recent conference had 150 people in attendance and got a great reception- there were 6 actual farmers present....

If these are the farmers who have survived in California dairying what is going on? The reasons are that they are self-educating and in many cases too busy "solving problems" to leave the farm. There is no sharing of information between farmers, at least in a formal capacity. Apparently the general

consensus is that every farmer is your competition. You don't want them to improve because it gives you an advantage to be above average. They are competing for land with each other and with many other cropping systems, especially as it is extremely fertile land in central California. These will put a stop to further growth to the industry also.

Now what exists are farmers who come together for agri-politics but not to help each other (or themselves) improve their businesses. Isolation is not an issue as many of these farms have plenty of employees- so why go off farm? Has the extension system in the state not adapted to the new set of needs these farms have. Why attend a conference that tells you what you have already heard many times... is this an issue arising for the Irish top 10%? With no new blood, is this a culture of farming that is attractive to the future farming community?

3. Measuring and Improving Development Programmes

Measuring Learning Outcomes

Quantitative Measures

Devices have been created to count, record and keep track of attendance at events and to organise the events themselves. However, this only identifies the topmost layer of the event analysis. According to Audience Dialogue (www.audiencedialogue.net Accessed August 2016), electronic devices have been used by organisations in the US and Australia to measure audience reactions to music at events, radio programmes and speeches. The data is collected on a second-by-second basis which upon interpretation highlights the impact of certain points in a performance or event.

Surveys and feedback forms are common methods of collecting opinions on courses or seminars. This is not often formulated to create a scientific proof and generally has little in the way of a best practice guide. The results are often used to improve the event the next time. Literature shows that these feedback sheets to score an event on different traits out of 0-10, the score always averages 7, regardless of the questions asked or who asked them (www.audiencedialogue.net Accessed August 2016). In this scenario, 7 is actually considered a low average if the event was a success because the range in answers now has a higher base.

There are four main problems identified with this form of feedback:

1. It only measures opinions and not knowledge or behaviour
2. The survey happens too soon and doesn't allow for behavioural change
3. At the end of a long course participants often forget what they heard throughout the day
4. It restricts feedback to only a small portion of the event itself

For professional event planners there are guidelines on improving the evaluation of courses and events. This can be carried out by A. considering the planning process around the course/event and B. Considering all the people involved including those who did not attend but were affected in some way, e.g. if an event fails at the box-office it may still have an impact on artistic inspiration, or employed the skills of local people.

Standard evaluation scales aid benchmarking of courses and events in a standard format compared across industries or regions. Peer reviews, or the utilisation of outside expertise to evaluate the event- this however, is limited in providing measures on impact of the event.

Regular and brief feedback sessions in both written and spoken formats give useful information that can improve the current running and hence potential impact of longer courses. In this case, one feedback questionnaire at the end of a week long course is too late to do anything with.

Multi-response and open-ended questionnaires give the most detailed feedback as people often give time to think of their experience prior to answering. Including behavioural-intent questions can give some insight into impact and changes that may happen in the future e.g. "If the group were to meet in a month's time, how likely are you to attend?". Similarly, these type of surveys are followed up in a month to two months' time to identify what behavioural change has occurred.

Case Study- Jeff Coutts, Queensland, Australia: The story of evaluation

Jeff Coutts is a consultant based in Queensland, Australia, who primarily focuses on the design and evaluation of change in rural industries and communities. Dr Coutts has worked with many private and public organisations to set-up evaluation systems with the objective of providing feedback on effectiveness and influence to the key stakeholders and funders. Current and former projects include work on the Great Barrier Reef, climate change, Dairy NZ, Australian Lamb & Beef and many others.

"For successful programmes, evaluation needs to be involved at the very start" If you can set criteria then measure them constantly, and not just normal measures like attendance and frequency. Other measurements include case studies, narratives and surveys to review the impact of the programme or event. "Tell the story- that's my mantra", Jeff aims to review programmes in a holistic way and believes in the combination of qualitative and quantitative data. For example "I want to be at a stage where we report on programmes like pasture management on beef herds and say that: 200 beef farms making up 30,000ha and 50% of beef outputs in the region have made changes to improve pasture management. They improved fencing, grass, infrastructure and this led to increased net worth of \$xx to the farm income, \$yy to the environment and \$vv to the value of beef outputs in the region". The vision is to have evidence to back this up and example case studies of change in action.

The vision of the future is to report on all Australian agriculture in this way and how the different sectors interact. This evidence based and professional 'story' can be used to gain new custom but also to potentially engage the public with the views of agriculture as a viable business. Interest in evaluating impact from funded programmes has increased in the past decade. This could be linked to the emphasis on return on investment and the role of private organisations and groups in these types of projects, money is scarce so you want to create an impact with what you do. The evaluation of agricultural programmes started in the 1990's in Australia as there was a reduction in investment from government into extension and agricultural support.

Coutts learnings from a project carried out with the Great Barrier Reef improvement, working with farmers in the region, identified the key determinants of change were based on peer group learning

and the readiness for change experienced by the farming families involved. Financial incentives also cause change but how permanent is the change and how sustainable is it to continue this practice?

Dr. Coutts pointed out that it is often difficult for programmes to find a budget for evaluation. However, this is where efficiencies can be made as extension often involves promoting best practice skills that have been around for a while and potentially this area of knowledge systems has the potential for greatest improvement.

Frameworks for Programme Evaluation

As management in organisations are often the ones seeking the return on their investment and value of a programme, Dr. Jeff Coutts has found that evaluation structures and frameworks best achieve this. The Bennetts Hierarchy is one of the best methods for structuring programme evaluation (Coutts, November 2016). Rockwell and Bennett, (2004) outline an initiative called Targeting Outcomes of Programmes (TOP), aimed at identifying programmes outcomes and documenting their achievements. This has been created on the basis of current programmes inability to plan and evaluate in order to help participants achieve their goals. TOP is a further development of Bennetts Hierarchy (Bennett, 1975) see figure below.

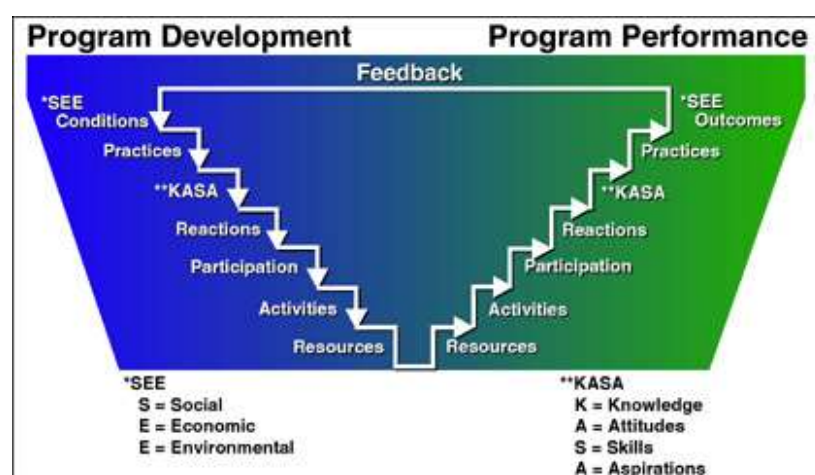


Figure 6 Bennetts Hierarchy

Improving learning structures

In the 1980's the NZ dairy sector had 26 consulting officers spread throughout the region. Each officer had 1,000 herds to over-see and had no office as there was no regulatory or administrative roles to be carried out. They supported farm families through on-farm visits, discussion groups and field days (1/3 of their time on each). A survey carried out at the time asked the consulting officers what they felt was most important competency to have, and the majority said 'to be an effective communicator and listener'. The less experienced and newer CO's selected 'to be technically competent'. This found that those who were successful as CO's and stayed in the job over a long period identified personal skills as having the highest importance or that technical competence was taken as a given. Phillips (1984) identified that agricultural colleges training these extension officers were focussed on the technical competence when the communication skills had no role in the curriculum whatsoever. The role objective of a consultant officer was "to assist the dairy farmer to make better decisions for

himself rather than to be told what to do". The role is for support and facilitation of learning not lecturing and dictating.

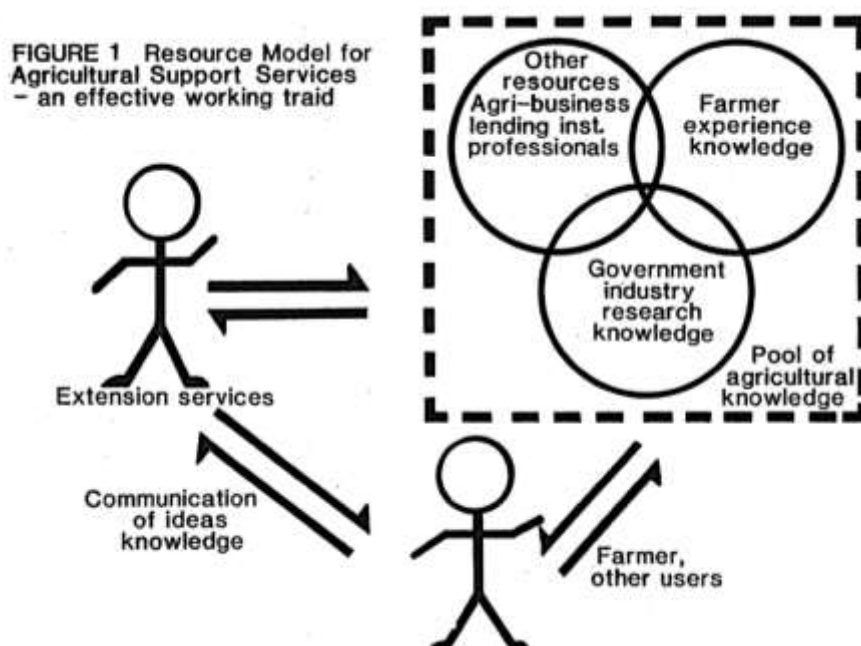


Figure 7 Extract from Australian Tom Phillips MSc thesis 1984

Today's recruitment structures for employing new consulting officers into Dairy NZ include an on farm practical interview using a mock discussion group. The farmers involved give feedback on the interviewee's ability to communicate to them and their personality and facilitation abilities with the group of farmers. This is an essential focus on communication skills over technical competence that is realised not just by Dairy NZ but has come from the farmers who work with the consulting officers in the first place.

The original concept for farmer-to-farmer learning came from gardening groups that were established in the 1950's. For the organization Dairy NZ the discussion group model is the basis of their support for farm profitability and innovation. In the 1970's 70% of farmers are participating in discussion groups. The organization itself has originated from various formations of farmer-owned cooperatives, where today a dairy levy paid by all dairy farmers in New Zealand provides the funding for the organization.

Innovation and ideas in how discussion groups were run has changed over the years. Some providing great addition to farms such as the Whole Farm Assessment Model, and other changes that didn't improve group quality and so were removed. Training periods for new consulting officers is intensive in communication and facilitation upskilling. Continuous assessment on the running of groups and feedback in the form of "I like..." and "I would have liked..." help encourage improvement in the running of groups. Both colleagues and managers are aware of the process and it is promoted in this culture of coaching and mentoring each other. Dairy NZ's Simon Sankey outlines the promotion of flexibility and innovation in learning for farmers, for example Canterbury has the most movement of people in collaborative farming arrangements so workshops work better than groups in some areas, especially as people/ are always networking and getting to know each other. On many farms the

availability of resources online and through newsletters provides the support that they need, even if they are not part of a group.

Case Study- Dairy NZ: Measuring impact of development programmes

Recent research papers from Dairy NZ boast that in the early 2000's farmer groups increased from 200 to 300, and farmer attendance at events increased from 30% to almost 60% of all dairy farmers in New Zealand (Sankey, 2015). But these are not their only measurements.

Surveys are carried out at every event by farmers and from a contracted company, a sample of farmers are called to rate what has changed on their farm since the event. This started as Dairy NZ started to recover more information about farmers and their involvement over a period of years. This data enables an external company to evaluate the rate of 'connection' with farmers in any give region and for a consulting officer. Each region compares and benchmarks against each other to drive improvement.

Evaluation Approach	1. Evaluating Impact	2. Monitoring success	3. Evaluating Process	4. Evaluating programme design	5. Evaluating for programme development
Purpose:	Justification	Accountability	Improvement	Clarification	Synthesis
Timing:	After Program	Throughout	During implementation	During Implementation	Before Program

So what drives this investment and enthusiasm for measurement when many organisations across the world don't do the same? Simon Sankey of Dairy NZ outlines the funding structure of Dairy NZ and the influence this has in relation to ownership from the farmers paying a levy and their continuous (and justified) requirement for the return on their investment. This information provides detailed evidence to present to all farmer stakeholders as to why they should continue to invest in Dairy NZ (amongst many other measurements with research, etc). Evaluation has evolved to include Jeff Coutts approach of 'telling the story' of knowledge and innovation amongst NZ farmers. Case studies and narratives are examples from every consulting officer with Dairy NZ that tell of a farmer they worked with, what change or improvement they made and why, and what economics value it has brought to the farm, each case study is fact checked with the farmers involved. These are only adding to the evidence for funders to continue their investment into the future. Consequently these measurements have given the consulting officers more confidence in their role and blends the qualitative and quantitative aspects of evaluation together. Bennett's hierarchy helps put a framework on this reporting model to encompass everything that is done.



Picture 6 A tree growing inside an old concrete feed bin in Illinois, USA. Livestock farming has all but disappeared as corn and soya has become more prominent in the state

4. Private funding for Farmer Development Programmes

Good PR vs Development

With an increasing trend in ‘advisory teams’ being born from commercial farm input companies, banks and even supermarkets- it begs the question: Why are they investing in this? What’s the return? Successful international businesses are aware of costs of production, return on investments and overhead costs. So by establishing a team of people to advise farmers on product usage, setting up a farmer leadership course or investing in relationships with farmers is done with not only the benefits to the farmers in mind.

Case Study- Global Syngenta/ Monsanto: Developing the Developing countries

Monsanto and Syngenta, at the time of presenting, were some of the largest agrochemical and seed distributors in the world. Both organisations saw the growth of their markets in Asia-Pacific, where there are predominantly developing countries. With millions of farmers in this region the concept is that by getting each farmer to purchase from them this is an extreme growth centre albeit smaller volumes. However to maintain this sales pool the farmers needs to be sustainable enough to be able to pay and to be able to continue to buy more in the future. With this in mind Syngenta and Monsanto have set out ‘Sustainability Programmes’ or strategies on ‘Solutions for Sustainable Agriculture’.

Monsanto have established a Farm Advisory Service (MFAS) a free service for corn growers that can phone an advisor to speak directly to them about any issues they are having on the farm. This service

is available 365 days per year and its benefits are highlighted as a customised approach to getting information to farmers to improve farm management. The information includes reminders to soil test, planting populations, spray times etc including a sales service to access prices and products over the phone. This 'advisory' (and sales) service has reached out to over 800,000 farmers in recent years. In discussions the company representatives note that its very expensive to run and therefore must demonstrate a return on investment. Although the 'return' was not defined it insinuates that the service has sales or payment targets to achieve also.

Benefiting from public & private collaboration

Trends in funding of development programmes around the world show that they originate from government driven initiatives (Ireland) and become hybrids with farmer/industry funded sources (Australia) before eventually becoming solely reliant on private sources of funding (New Zealand). Depending on the public's knowledge and acceptance of funding agriculture and food initiatives funding, particularly in Ireland is most likely to evolve too. When government funds are being demanded through health and education systems (to name but a few), agriculture and food incentives move down the list.

What does this mean? It means that private funding will have an increasing role in advisory and knowledge development. The question is whether this is always to the farmers and the farm businesses benefit. No doubt commercial companies are advising on farm inputs usage with the best intentions, however this does not always align with the whole system model of the farm e.g. payment mechanisms, costs of production etc. The future requires the involvement and collaboration of every farmer-facing industry to be strong and ethically aware of what improves farm sustainability, and to do this there needs to be a belief in a common message. Ethics around commercial selling of farm inputs needs to be kept in check, while awareness of whole farm systems and payment structures is required.

In a structured and organised framework the public and private relationship can be a very strong and beneficial one in Ireland, once everyone believes in it... and wants it.



Picture 7 Pineapple picking in Java island, Indonesia on a 30,000ha pineapple plantation. Small farmers working here to earn an income

Discussion & Conclusions

Innovative disruption of development programmes is self-explanatory, however to explain why it is necessary requires a step back to observe the bigger picture of what Irish agriculture is working towards and how it can achieve it. With market volatility, economic and political instability the onus to prepare and empower people to help themselves has become increasingly relevant. The often prescriptive, heavily technical, activity driven (vs impact driven) approaches embedded in our current structures of development need to adapt to this unpredictable climate. To be relevant to the next generation and providing a thriving, challenging and worthwhile working and learning environment in the agricultural industry is not the responsibility of any one institution or person.

Exceptional farmer development programmes around the world are focussed, evaluated, flexible and inclusive. The future of our own advisory bodies and drivers of farm improvement should first of all be focussed on self-reflection and re-evaluate what it is that is to be achieved as an industry. Once the clear objectives are outlined the results can be measured and challenged through a strong and challenging committee of farmers and industry representatives. Integration of not only quantifiable measurements like discussion group numbers and attendance, but also case studies, survey evaluation of events and even to contract out the follow up of actions taken from groups or workshops. This action helps take a step towards self-reflection and improvement by no longer assuming what's working or what's relevant to people, but to have evidence. Including the reflection of external experts to benchmark the performance of our programmes and their ability to keep up to date with adult-learning research is essential for future effectiveness.

The breakdown of the methods of learning and processes for adult-learning need to be re-designed. The current focus on 'technical- information -transfer' assumes farmers are passive receivers of information and not people with knowledge, experience and critical-thinking processes of their own.

Instead of the concept of 'Knowledge Transfer' we should be looking at 'Knowledge Sharing' to empower and acknowledge the expertise farmers already have and they are harnessing that knowledge to motivate adoption practice in other farmers.

Dairy NZ select their CO's (consulting officers) by involving local farmers in the process of a 'mock' discussion group to establish their ability to communicate and personality towards effective learning. Not only are farmers involved but the emphasis has been refocused on communication and personality instead of solely technical knowledge. In commercial industry this is particularly important to promote farmer development instead of 'product-pushing'. Consequentially or not, the reality is our national body, Teagasc, has moved away from farmer focussed personnel to paperwork and grant focussed-hybrids, not always to the delight of the technical-focussed advisors on the ground. A change to having specific enterprise focussed teams who are strong communicators, facilitators is essential to promote the future empowerment of our farming industry.

Empowerment and farmer ownership is the only way that any changes can be made, once they recognise themselves as not being passive receivers of information but rather being central to the process of research, education and extension. Although the 'top' % of farmers are steering the innovation and future research of technical agriculture the 'average' farmers should be involved in the process of communicating this information and innovation. Identifying opinion leaders and role models in local areas is essential to supporting adoption practice and management change. As this is not only associated with private industry cooperatives and commercial industries should also take ownership for their farmer-facing team and drive them in the same direction of involving farmers and driving a message unified with Teagasc.

More private industry are taking a role in farmer development now from commercial companies to cooperatives and banks. Yes this is good PR for these organisations to do so, but with the goal to cause overall improvement in the sustainability of their farmers clients or customers and being cognisant and inclusive of the messages from Irish research they can cause great change. By giving additional power to the message by Teagasc by involving themselves in steering groups and included in the process of farmer development they too will have more ownership in where the industry is directing towards, and is profitable in the long-term not just about sales and short-term benefits.

To conclude the Irish agricultural industry has a plethora of organisations and bodies prepared to support farmers into a prosperous future but only through reflecting and reinvigorating our existing structures can this lead to effectiveness.

Recommended Disruption

“My past is everything I failed to be”- Fernando Pessoa (The Book of Disquiet)

1. Development programmes should be measured to reflect both quantity and quality of the programmes.
 - a. As Teagasc is a government body the focus on evaluation has not been as strong as Dairy NZ. However, as an industry there should be a programme of evaluation funded to continuously improve and innovate in our knowledge and training systems
 - b. The softer sciences of case studies, narratives, communication skills and facilitation skills need to take a more active part of the future agenda for knowledge systems in Ireland
 - c. Benchmarking with other countries such as New Zealand and including experts in the areas of evaluation can help us take the first steps towards improvement
2. Focus should be reassigned to having advisors that focus on technical and communications with all form-filling and regulatory work is given to those who prefer it.
 - a. Agricultural degrees should include communication and facilitation skills in their teaching and learning to promote ‘softer skills’ in future graduates working with farmers.
 - b. Teagasc dairy advisors should only be on farms and with discussion groups. Those strongest at paperwork and grants should stay and the strongest communicators to become the next generation of dairy specialist advisors.
 - c. All industry personnel giving advice on farms should be trained in facilitation and mentoring to encourage support of learning and farmer development. Particularly new and young advisors prior to engaging with discussion groups or events.
3. Farmers need to take more ownership and be asked to get involved in research and development programmes
 - a. Identify the ‘role models’ and opinion leaders to help create the environment for farmers to learn from each other.
 - b. Yes the ‘top’ farmers do and should continue to drive new research and innovations BUT the ‘average’ farmers should drive the communication and packaging of that new research and innovation
 - c. Industry bodies such as coops and commercial organisations should take ownership for their farmer-facing teams and unify the strength of an all-Ireland knowledge and development system.
4. More private industry in taking a role in farmer development- is this just good PR or having an impact?
 - a. All organisations offering ‘advisory services’ should be coordinating with Teagasc on offering a strengthening and unified approach to farmer development and not one that is unprofitable in the long-term.

- b. An overseer of all farmer development programmes should be appointed from a university or government to help steer this process.

Vision for Farmer Development Programmes

- A. **Involve stakeholders in design** to encourage ownership and empowerment amongst the people that are affected the most
- B. **People Learn Differently** so multiple channels of communication as well as promoting effective communicators to facilitate knowledge-sharing
- C. **Evaluate performance** is essential to measuring and managing performance. Thus creating a feedback loop to constantly reflect and improve the impact of programmes
- D. **Be flexible & change** as needed. An awareness of recent adult-learning research and decision-making, social principles and factors of learning can help feed into the constant improvement of farmer development programmes



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