# Matching need with delivery: New Zealand farmer learning case studies

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## Abstract

Effective farmer extension programs are needed for industry to capture the benefits of agricultural research. We describe three case studies adopting different delivery approaches to extension. Each case study was developed using key principles of adult learning, particularly the principle of learner-centred approaches where farmers are part of the design and development of workshops, tools and resources. The case studies are discussed in relation to the needs of the adult learner, including the need to know, self-concept, prior experience, readiness to learn, learning orientation and motivation to learn.

**Keywords**: farmer learning; adult learning; case studies; rural futures

## Introduction

On-farm practice change is essential to capturing the benefits of science. However, often we find our most passionate supporters of research, farmers, are slow to adopt our science for a wide variety of reasons. The business of farming is increasingly complex and approaches to farmer learning and extension must recognise this complexity and the opportunities and challenges faced in the delivery of adult learning packages. Successful learning activities need farmers who are motivated to seek out information and willing to learn. In addition, different approaches for extension are needed. The time-poor society we live in means that researchers must better match farmer needs with appropriate delivery approaches.

The average age of New Zealand rural decision makers is 56 (Brown 2013). It has been widely recognised for some time that adult learning should be learner-centred (Bruner 1968). We should not presume that the people who design and deliver adult learning know what it is that adult learners wish to learn and what form or style they wish that learning to take. Rather, successful learning commences with a comprehensive understanding of learner needs and readiness for the learning (Rogers 1969; Knowles et al. 2005). We also know that this understanding should be used as the basis on which to design and develop content and choose appropriate delivery styles which will meet the needs of all learners in the target group.

To demonstrate the importance of matching delivery approaches to topic and targeted audience, we describe three approaches to farmer learning each developed, implemented and delivered in response to a clearly defined sector challenge. The three approaches presented here include the co-operatively developed planning learning package (Feedsmart), a farmer-centred awareness raising approach (Farmers Understanding Climate Change) and a collaborative process for exploring rural futures (Exploring Futures Platform).

## Co-operative developed planning learning package: FeedSmart

The development of the learning package involved a team of AgResearch modellers, farm systems experts, farm consultants and social scientists working closely with farmers to develop a suite of feed planning computer tools and workshops. The FeedSmart feed planning learning package consists of a suite of computer tools, a workshop manual and a series of five differentiated workshops (Brown & Bewsell 2010). An important aspect of the development was the high level of farmer-user involvement in the development and piloting of the tools and workshops. Farmers were included in all stages of the development to ensure the end product, the computer tools, would meet their needs and thus increase the likelihood of the tools being adopted and used.

A market research approach called context segmentation (carried out via postal survey and face-to-face interviews) was used to establish an understanding of farmers' current feed planning strategies and underlying knowledge sets and gaps in their knowledge. The survey was also used to obtain information about farmer preferences for learning event formats, preferred days of week and times and preferred advertising approaches.

The survey findings made it possible to group respondents into segments illustrating current farmer feed planning practices, knowledge sets and by default, issues and questions (Brown & Bewsell 2010). In particular, the findings, by helping in the identification of the different contexts and needs, enabled these to be built into the learning package. The survey also identified the characteristics and likely farming locations of farmers who might be interested in learning more than formal feed planning; farmers who were not interested in learning about formal feed planning; and farmers who had tried formal feed planning approaches, but had abandoned them because of experiences that had not previously been

accommodated (for example, difficulties around measuring pasture on hillsides).

The findings of the context segmentation survey informed not just the development of the workshops, but also underpinned the advertising campaign to attract farmers to the workshops. The context segmentation showed for workshops to have maximum appeal to farmers they must be highly relevant, that is, be about their own farming systems and deal with local issues, preferably each farmer's own feed planning issues. Further, they must contain content which is directly relevant to the farmers' prior knowledge, expertise and interests. Farmers said that they prefer to learn in small groups (10-15 people), and from both outside and recognised local lead farmers. The survey also showed that the greatest number of sheep and beef farmers were not interested in moving to formal use of computer tools, but rather, that they were interested in bettering their skills at informal or intuitive feed planning. Workshops were developed in order to best satisfy these clearly defined identified needs. The draft workshop formats were tested with groups of farmers independent of the development phase to ensure they met farmer needs and interests. The final workshops series consisted of modules for: farmers new to feed planning; experienced informal feed planners; formal feed planners interested only in learning about the FeedSmart feed planning tools; women farmers; and special interest groups e.g. employees in a large farming corporation who wanted a workshop tailored directly to their farming situation and usually held on their property.

***Main lessons learnt about co-operative development of a learning package***

- The differentiated workshop format resulted in all workshops being very highly rated. However this approach had greater development and delivery costs.
- Personal invitation was the most effective form of advertising for workshops, a local champion and multiple sources of advertising assisted success of personal invitation.
- It is difficult to attract farmers to learning events in times of economic decline and/or low confidence in their sector.
- With innovative thought, it is possible to design fully interactive, participatory, hands-on adult learning sessions which are delivered via video-conferencing and supporting technologies.

## Farmer-centred learning: Farmers understanding climate change

Farmers understanding climate change was a project funded by government (MAF) with support from PGgRC. The overarching purpose of this project was to raise farmer (sheep and beef, dairy and deer) understanding of climate change (CC) and greenhouse gas (GHG) impacts, adaptations and possible mitigation options, whilst identifying the characteristics of resilient farming systems. In essence, through involvement in the project, farmers and rural professionals would learn how to plan to capture opportunities presented by climate change and minimise the downsides of climate change, as the climatic and economic environment in which they operate changes. They would also have increased ability to engage in informed debate around CC and GHG emissions and mitigation and any regulatory initiatives.

A further aim of the project was to co-develop, with the project farmers, rural professionals, industry partners and technical experts, learning materials that would be made accessible to other farmers and members of the wider agricultural community. In practice, a total of 14 existing farmer cluster groups (seven sheep and beef, five dairy and two deer), each consisting of up to approximately 15 farmers, were engaged. They covered a range of climatic and geographic areas and different farming systems across the country. These groups were invited to join the project at different times over the three year span of the project. A scientist, facilitator and local farm consultant worked with each group to assist with the learning process. The learning process was deliberately structured to be both flexible and evolutionary so that the learning would primarily follow the needs, interests and questions of the farmer participants and not those of the facilitators or project management team.

In order to make the learning 'relevant' and applicable to each cluster group, their farming location and their local farming systems, the learning discussions and content were focused around the co-development of a case study for each cluster group. The case studies were based on either a real or a 'typical' district average farm for each cluster. Each case study consisted of Farmax and Overseer® nutrient budget modelling of base-line emissions and a range of farmer-identified scenarios which captured potential and practical management systems which could be used to change total emissions or the intensity of emissions from the base farm system. While one case study was identified as the 'main' case from each farmer group, we modelled an additional 3-5 farms in each location to enable individual farmers to gain an insight into their own farms emissions. The additional data enabled within and across region and sector comparisons.

From the outset of the project, it was established that the cluster groups could leave the project when they felt their particular learning needs had been met. On this basis we envisaged that each group would likely remain in the project for twelve to eighteen months and then leave to be replaced by new groups of farmers.

However, this revolving concept of groups coming into and going out of the project did not take place. Rather, because of the extent, complexity and on-going addition of new information on these topics,

the original groups asked to remain on, and with the agreement of the funders and the project Reference Group, most of the groups remained with the project for the full three years. This did mean that fewer groups than anticipated had the opportunity to benefit from the in-depth learning but we compensated for this by: opening a number of the cluster group meetings to members of the wider agricultural community; by putting out media articles on the group learnings; and by having project team members give a large number of presentations on the project findings to farmers, rural professionals and scientists.

This project used two delivery modes to facilitate learning in the farmer cluster groups. They were the traditional face-to-face meetings and new blended e-learning delivery options, which included video-conferencing and webinars (Brown & Fraser 2011). We chose the face-to-face approach primarily because we wished to employ learning approaches that build on adult learning principles, would maximise learning through repeat participatory interaction, and could handle the complex, sometimes controversial and evolving subject matter of climate change induced through increased greenhouse gas emissions.

With one cluster group, a women-in-dairying group, we used a blended e-learning approach, that embraced video-conferencing, webinars, face-to-face presentations and science visits as a possible approach, which could be used to facilitate learning with farmer groups in the future.

The learning processes used within the blended e-learning approach was also designed on the adult learning principles that the learner should be at the centre of a learning process that is based on the learner's interests, issues and questions; and where the direction and pace of the learning is set by the learners.

All cluster groups were assigned a technical 'expert', whose role it was to facilitate the learning process with assistance and input from other 'experts', farmers, rural professionals and scientists as necessary to answer the farmer identified questions. Groups met on a regular basis, each six to eight weeks. Each session consisted of presentations, discussions, and information sharing and generation of questions/ topics relevant to each particular group. The groups also took part in the identification of possible fact sheet design and review of fact sheets and project resources.

The 'responsive' learning process commenced with raising awareness and, in most cases, moved then to engagement at a specific business level, followed by investigation of opportunities and downsides, concluding with investigation of future options. Whilst the project aimed to cover both climate change and greenhouse gas impacts on farms, different cluster groups chose to follow different pathways according to their specific interests and questions.

***Main lessons learnt about collective, learner-centred, learning approaches***

- Individual learning can be maximised by keeping cluster group numbers to 10-15 participants.
- The face-to-face meeting approach is suited for exploring complex and evolving topics.
- Repeat learning sessions maximise learning, because they enable learners to engage in a cycle where they ask questions, discuss, reflect, ask more questions, try new actions and ask more questions, over an extended time period.
- Individual learning is maximised when the learning content is directly relevant to the learner's own farming system, situation, interests and concerns.
- The use of farm modelling which focused the learning by making it real and relevant made the learning experience more engaging and valuable in for participants. The interactive approach used in the project made learning a truly collective, two-way-process for both the farmers and 'technical experts'.
- The shorter, nine month blended e-learning approach showed promise as an intensive learning option.

**Collaborative processes: Exploring futures platform**

The Exploring Futures Platform was developed within the Rural Futures programme to assist a range of stakeholders "*explore, learn, plan, innovate and thus gain confidence to proactively and effectively respond to complexity"* which *"are required if the pastoral industry is to continue to exist and thrive in the future*" through evaluating possible future scenarios (Wedderburn et al. 2011). The approach is designed to explore potential futures through the application of systems thinking (Wedderburn et al. 2011). The platform has six steps: 1. Identifying future drivers, 2. Developing future scenarios, 3. Representing farm systems and behaviour, 4. Evaluating system performance, 5. Testing strategies, policies and decisions and 6. Reflection. This six-step process was developed on the adult learning principle of having the learner at the centre of the process. Each step of the process facilitates opportunities for the learners/participants to identify the issues that are important to them. The learners then identify possible scenarios to change or improve these issues, and the scientists provide objective data which the participants use to consider likely collective impacts, consequences and intended consequences of different interventions, policies and practice change.

The Hawkes-Bay Pastoral Group (an established group including farmers, regional council staff and industry representatives, formed to provide leadership in sustainable pastoral land management in the east

coast region) piloted the use of the exploring futures platform (EFP) framework, to identify and think about plausible futures (20-30 years out) for their region (for more details see Bewsell et al. 2013).

The group came to the case study with a clear view of the issues for their region of declining profitability of the regions' pastoral industry, ongoing issues of hill country erosion, declining rural infrastructure and emerging concerns on water quality. A series of four workshops were undertaken with the group over a 12 month period.

In the first workshop, the group identified some of the key issues for their region, in the context of sustainable development, and the current and future drivers of development in their area. These issues were used to develop future scenarios for the region. The third part of the EFP process involved using farm systems information, biophysical, economic and social, to describe the outcomes of the scenarios developed. In the final workshop, the group evaluated the scenarios using their existing knowledge and experiences, with additional input from a simulation model (Schilling et al. 2013). The group considered futures which included co-ordinated lamb production and finishing and increasing pastoral land under irrigation. Underpinning the EFP is the use of participatory processes to ensure collective learning, decision making and critical reflection (McKay & Marshall 2001). The goal of the EFP process is to help participants jointly define opportunities and challenges, and start working towards joint management of solutions. The EFP is based on collective learning where participants have a problem-centred orientation to learning rather than a subject matter orientation (Knowles 1980; Mezirow 1997).

***The main lessons learned in the development and application of the EFP were:***

- The importance of ensuring that members of the group involved in the process have a diversity of views
- The benefits of delivering real- time local data
- The value of building an understanding of the system in the development of meaningful future scenarios

## Discussion

The principles of adult learning must be at the core of planning, designing and evaluation of extension activities. The first workshop of the Farmers understanding Climate Change project focussed on what farmers would get out of the project and why they needed to know about Climate Change and Greenhouse gases, meeting the need of adult learners to know why they need to know something before they will learn (Knowles et al. 2005). The learner centred approach to the content and delivery of the Farmers understanding climate change created an environment where adults self-directed their learning enabling their "learners' self-concept" needs to be met (Ota et al. 2006).

Farmers come into a learning environment with a great deal of existing knowledge and experience. This was recognised in the development of the FeedSmart programme with five different workshop programmes developed to reflect the farmers underlying knowledge. The use of farm systems modelling in climate change and greenhouse gas studies enabled farmers to contribute their expertise and build on it. At the core of the success of the EFP for considering future scenarios for the Hawke's Bay region was the knowledge and expertise which participants bought to the identification of issues and plausible scenarios for their region for the modelling exercise. Farmers want to learn things which are relevant to current issues and preferably to their own farming context; the Farmers Understating Climate Change project tapped into this opportunity and facilitated ongoing involvement of farmers as the issues of the Emissions Trading Scheme evolved over the life of the project. Adults are task- and problem-centred in their orientation to learning (Knowles et al. 2005). The elements of the FeedSmart program with short lectures, facilitated discussion and hands-on practical tasks facilitated a strong learning environment.

## Conclusions

Adoption of technology on-farm is a complex function of many factors: the decision maker, the technology, the farm system, the context, external factors, etc. This paper offered useful insights into decision-maker preferences on adult learning styles. The richest resource for learning resides in adults themselves, understanding how to tap into this resource and facilitate an environment for effective adult learning will assist scientists in uptake of research.

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