

Facilitating farmer learning about Southern South Island winter management practices

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Abstract. How dairy cows are being wintered in Southland, New Zealand, has become an issue generating community conflict. This paper describes how livestock industries in the Southern South Island responded to the issue providing technical guidelines and farmer support for the introduction of Good Management Practices for Wintering (GMPW). It includes some background information about practice change principles and the theoretical model used to link farmer learning, attitude change and human behaviour. The paper has results from focus groups held in February 2020 as an alternative to reiterating the same technical information that farmers had already been exposed to for some time. The groups provided a learning intervention using facilitated discussions with farmers based on scenarios for self-reflection and in-depth consideration. This was a very successful approach for achieving the attitude changes needed to underpin practice change. Average ratings on three attitude measures increased from neutral (2.5/5) to positive (3.8/5) ($p < 0.001$).

Keywords: dairying, critical source areas, practice change

Introduction

Dairy industry background

In 2019 a national campaign was initiated in New Zealand challenging the way that dairy cows were being farmed during winter. It featured pictures from Southland of dairy cows standing in mud. The pictures and public controversy 'riled up everyone from farmers to activists and resulted in the agriculture minister Damien O'Connor setting up a taskforce to look at the practice' (Southland Times 2019).

Livestock industry organisations in Southland and South Otago have been researching ways to reduce the stress of winter grazing in the region on animals and the environment for several years. The negative publicity that occurred in 2019 undermined the reputation of farmers in the region and throughout the wider industry. Although the livestock industries had been promoting to farmers the results of their research, the amount of practice change on farms was not sufficient to meet stakeholder aspirations and address public concerns.

Over recent years the industry had been encouraging dairy farmers to modify their approaches to wintering cows in anticipation of increased public concern. Responding to the additional public scrutiny and to assist in resolving the issues that had been raised, the dairy industry put together their preferred winter-grazing activities and provided these as a management package for farmers and graziers (DairyNZ, 2019). The package of good management practices for wintering (GMPW) included all the following activities:

- Establishing buffer zones, directional cultivation and restricted grazing, in order to protect critical source areas (CSAs) from damage and reduce overland flow of nutrients, sediment, and pathogens into waterways.
- When winter grazing, limiting soil damage and reducing overland flows into CSAs by:
 - Back-fencing and using portable troughs to reduce the movement of animals.
 - Having and implementing a grazing strategy for winter crops.
- Creating a winter-grazing plan that includes animal welfare contingencies to shelter and feed livestock during adverse weather.
- Involving the farm team in developing and implementing the winter-grazing plan.
- Soil testing with a nutrient budget to reduce nutrient use for crop growth (and losses into waterways).
- Developing and updating Farm Environment Management Plans that identify possible environmental risks for the farm business and describe ways to avoid, reduce and mitigate these.

A social research and agricultural extension study was initiated in early 2020 to provide DairyNZ with insights and understanding about how dairy farmers were responding to the introduction of GMPW and the guidelines that had been published. Whilst undertaking the project it became apparent to the authors that there was an opportunity to evaluate if participation by farmers in the focus groups had contributed towards their learning about wintering dairy cows, and if that learning was likely to be sufficient to generate practice change.

Practice change principles

There were a few approaches that DairyNZ could have used to understand farmer behaviour towards GMPW and to provide the basis of their campaign to encourage practice change (Parminter 2019). The set of principles closest to those already being applied by DairyNZ were those based on Rogers' seminal publication on the diffusion of innovations (1995). These included that farmer uptake and use of GMPW would be influenced by five main types of attributes of the practice:

- Relative Advantage. The degree to which the Good Farming Practice for Wintering (GMPW) was perceived to be better than the previous wintering approaches used by dairy farmers and graziers, particularly its effect on their costs and profitability.
- Farm System Compatibility. The degree to which the GMPW was consistent with farmers' existing values, experience, and farming operations.
- Complexity. The degree to which successful implementation of the GMPW utilised existing knowledge, skills and capability on farms.
- Trialability. The degree to which the GMPW could be broken into component parts in easily reversible forms, tried out and adapted as required, and then the whole practice reconstructed in its entirety for implementation.
- Observability. The degree to which the GMPW could be observed being implemented and its apparent results assessed and evaluated by 'external' observers.

The attributes of GMPW were known to provide the basis of farmers' attitudes and behaviours and they became the focus of this study and the group activities (Ajzen 1991; Parminter 2019).

Background into farmer learning and attitudes towards behaviour change

Motivational campaigns for behaviour change run by policy agencies are generally designed to encourage a desired change in the specific behaviour of a target group to benefit individuals and the social groups that they belong to (Parminter 2019). By themselves, motivational campaigns can change attitudes, although attitude changes on their own may not be enough to fully achieve compliance. This contrasts with regulatory interventions that often use threats of punishment to enforce compliance (Étienne 2010). On their own, enforcement of regulations may also not achieve full compliance (Kagan & Scholz 1984).

Attitudes have been defined as the degree of favourableness or unfavourableness with which people respond to any object of psychological significance in their lives (Ajzen 1991). When people find themselves in any new situation their attitudes towards that situation are formed immediately and generally involuntarily. However, 'attitudes cannot be directly observed but must be inferred from peoples' behaviour or stated likes and dislikes' (Ajzen & Gilbert-Cote 2008, p. 289). Some studies appear to show little relationship between attitude-change and behaviour-change (i.e. correlations of <0.40; e.g. Wicker 1969). However, this has subsequently been put down to a lack of comparable specificity between the object of an attitude and the behaviour (Ajzen & Gilbert-Cote 2008). When these have both been described using similar terms, correlations of over 0.6 have been achieved (Ajzen & Gilbert-Cote 2008).

People have new information and experiences presented to them continuously. Some of this information has largely subconscious influences and some is processed more consciously (Petty & Cacioppo 1986; Parminter 2019). During information processing people use their prior experience and knowledge to modify and add to any new information until they have made it their own (Petty & Briñol 2012).

The more that people can thoughtfully reflect on and consider relevant information about an issue or topic the greater the association there is between their attitudes and their behaviour (Requero et al. 2020). Some studies have shown that people can be encouraged to be more reflective by presenting them with a scenario that is relevant to them and to their situation. Focussing their thinking on a relevant scenario can minimise any unrealistic expectations that they may have that they can avoid dealing with and addressing potentially risky or threatening situations (Myers and Frost 2002).

The learning strategy described in the following study encouraged participants to reflect on a scenario in which winter conditions required them to modify their existing farming practices and then to evaluate the GMPW as part of their response.

Learning intervention

Participating in this study were 19 dairy farmers from the Southland and South Otago regions. They were invited in a convenience sample from a list of 45 farmers, to attend one of four focus groups during February 2020. At the focus groups the farmers individually provided their

background information and completed an attitude measure on paper. The attitude measure asked them to think about GMPW on their farms and it had three questions using a semantic differential and a sliding scale to assess how negative or positive they felt about GMPW (Tittle & Hill 2009). The three questions asked them about the ease, the usefulness, and how good the GMPW felt for them.

During the focus groups the farmers were asked to consider different aspects of GMPW and evaluate its use on their farms during winter as a way of managing adverse seasonal conditions (Parminter & Kitto 2021). To guide their reflection a facilitated workshop process encouraged them to consider the five attributes of technologies described earlier (Rogers 1995). This group exercise provided the reflective scenario for the farmers to discuss, consider and learn about GMPW (Myers and Frost 2002).

Beginning one week after the focus groups, the same farmers were telephoned and asked again about their attitudes towards GMPW. On the telephone call a semantic differential was used with a five-point scale. The two different scales were aligned by adjusting the results of sliding scale in the written questionnaire to a five-point scale.

Attitude change results

There were sixteen farmers that completed both sets of three attitude measures (Table 1). The consistency in the attitude questions was measured using Chronbach's alpha (convergent validity). A Cronbach's alpha result above 0.7 is preferred but results above 0.6 may sometimes be used (Hair et al. 1998).

Although there was some inconsistency in the way that the three questions were answered, the people in the focus groups became much more positive towards GMPW between the first and second assessment. The average rating increased from 2.5 (or neutral) to 3.8 (or positive), an effect size of 2.0. The increase was very significant ($p < 0.001$) using a paired t-test despite only 16 people being involved.

For the focus group participants there were no other events focussed on GMPW during the time between the two questionnaires. The main extension programme for GMPW was due to begin at the end of March 2020, but this was delayed and reduced to meet New Zealand's Covid-19 restrictions.

Table 1. Change in attitude scores

Attitude Measure	Number of Farmers	Chronbach's Alpha	Attitude means* and (Standard Deviations)	Paired t-tests	significance
Time 1	16	0.62	2.5 (0.56)		
Time 2	16	0.67	3.8 (0.74)		
Difference	-	-	+1.3	8.42	$p < 0.001$

* five was highly positive attitude and one was highly negative attitude

The study was not designed originally with an evaluation of adult learning in mind. The evaluation only became possible when it was decided to introduce a telephone survey after holding the focus groups. In hindsight, with such a purpose, the measurement of attitudes could have been improved. A Chronbach's Alpha of over 0.7 is desired and it may have been obtained in this study if the attitude questions had been tested first in a pilot programme to select those questions with a high Alpha and high discriminant validity (e.g. including a factor analysis).

Discussion and conclusions

Our results provide useful principles for extensionists engaged in encouraging adult learning and behavioural change. Since 2013 farmers in the Southern South Island had been provided science-based technical information about ways of improving the wintering of dairy cows to avoid environmental and animal welfare issues. The same information was being presented to farmers in different ways at multiple occasions until in 2019 and 2020 it was combined as the GMPW and a standard set of guidelines produced.

Rather than repeating a new presentation of the same information by technical experts, this study provided limited new information about the subject. The priority instead was for a facilitated process to engage the participants in learning from their own reflections and in making sense themselves of the technical information that they already knew. A key part of the facilitation was for each participant in the focus groups to construct in their own minds a scenario for their farm where they had to confront the difficulties of managing through winter conditions. The participants then engaged in critical discussions about applying GMPW within their own context and reviewing

how they expected the activities would work out for them and their communities. The facilitated focus group discussions led to a large positive change in the participant's attitudes.

The farmers were learning about a subject that they might not have been able to address for several months until it was winter, although they could begin to make some preparations quite soon after the focus group events. Such a time delay between a learning intervention and the behavioural context can make evaluating the direct results of adult learning interventions more difficult, however this study has shown the usefulness of measuring changes in attitude (and not just knowledge) to monitor the effectiveness of extension strategies. As described earlier, this relationship is conditional on the similarity of the behaviours under consideration and the description of the attitude objects in the questions being used.

Agricultural extension on technical subjects and policy issues tends to focus on providing farmers with increasing amounts of information. However, general research into the efficacy of messages promoting changes in behaviour indicate that there comes a point when the information is no longer new and continuing to re-present it becomes counter-productive to a segment of the target population (Myers & Frost 2002; Wolburg 2006). Early extension research encountered similar problems with promoting technical information (Tully 1966). In addition to providing information, the study described here suggests that there needs to be opportunities for farmers to consider and reflect on the information that they have already been given, in carefully facilitated discussions, applying what they know to scenarios relevant to their individual farm systems and farming contexts.

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