

'Decent dairying' – Findings from a Change Laboratory process to reduce fatigue on New Zealand dairy farms

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Abstract. New Zealand dairy farming has been contemplating adopting a 'decent work' model as a response to excess levels of fatigue. Fatigue at work can kill or cause serious injury or impairment of cognitive powers. Dairy workers are disadvantaged by their remoteness from the enforcement of labour standards, together with reluctantly compliant small employers. Using Cultural Historical Activity Theory (CHAT) and Finnish Developmental Work Research (DWR) tools, our research addresses fatigue and stress with plans to support cultural change. Initial ethnographic fieldwork is complete and workshops to explore long term, practical solutions to the problems of overwork, fatigue and stress are underway. A farmer-led approach to establish 'decent dairy farming' practices, based on what a 'decent' dairy farm has, what a 'decent' dairy farm does, and what characterises a 'decent' dairy farm employee is promising. Precise implications of this work for farming systems extension and research are still evolving.

Keywords: Farming, employment, fatigue, stress, research, DWR/CHAT

Introduction

By 2009, following a rapid expansion of the New Zealand dairy farming industry as a result of relatively favourable economic conditions, dairy exports reached 26 per cent of Total Merchandise Exports (Schilling et al. 2010). Thus, dairy exports became the single largest commodity type exported from New Zealand and a huge part of the New Zealand economy. These exports were produced by a national herd of 4.6 million cows on 1.63 million effective hectares of land, in 11,798 individual herds (LIC 2012), and employed some 30,000 dairy farm staff (Tipples and Trafford 2011).

However, in a self-diagnosis DairyInsight (2007), a farmers' public good organisation funded by a commodity levy had found that dairy farming was not attractive compared to other industries; its hours were long, its staff turnover was high and the recruitment and retention of employees was problematic. Further, the accident rate of the dairy farming industry was reported as the third worst in terms of injuries per person employed. Therefore, the second Strategy for New Zealand Dairy Farming 2009/2020 (DairyNZ et al. 2009) aimed for the following outcomes:

- Talented and skilled people are attracted to, and retained by the industry (Outcome 2).
- Industry reputation enhanced locally and globally (Outcome 4).
- Achievement of shared goals through genuine partnership between industry and government and the wider community (Outcome 5).

The updated Strategy for Sustainable Dairy Farming (DairyNZ 2013) states that a world-class work environment is to be provided that attracts, grows and protects people.

Similar problems had been identified in Australia and resulted in the 'People in Dairy' programme set up on three key principles of designing farm systems to suit people, increasing efficiency and productivity by matching people to jobs, and placing great value on having effective working relationships (Crawford et al. 2010). Crawford et al. (2010, p. 1111) draw from Buchanan's (2006) definition of decent work with the proposal that the ideal of decent work in dairying is:

A profession where individuals operate in a safe workplace, finding the work rewarding, are able to achieve a balance between their working and private lives, and have a career path.

Fatigue in dairying

Previous research by the authors aroused our interest in the problem of fatigue. In a study of Once-a-Day (OAD) milking, Verwoerd and Tipples (2007) spoke to a participant who recognised how he used to drive his bike too fast and came off regularly when milking cows Twice-a-Day (TAD). After converting to OAD and working fewer hours he recognised he was driving too fast and slowed down, thus reducing the likelihood of further accident or injury. Anecdotal cases further served to arouse interest. While completing dairy farming practical work (after 30 years as a sheep/beef farmer) one farmer collected two speeding tickets on his way home from milking after a blameless driving career. Fatigue impaired his cognitive functioning meaning he

had difficulty with Sudoku. Numerous cases could be cited of worn out dairy staff leaving, causing high staff turnover and adding to recruitment and retention problems.

Long hours are nothing new in dairy farming. For the 1937/38 dairy season, Doig (1940) reported 65 per cent of dairy farmers worked an average of 70 hours per week in busy periods, with permanent employees working 65 hours per week (1937-8). McMeekan (1960) notes the debilitating effects of tiredness on his school colleagues who were obliged to start the day by milking. Despite the mechanisation of milking equipment and automation of modern milking parlours, the hours of work for dairy farmers are still long. Wilson and Tipples (2008) in their analysis of Census 2006 data identified 61 per cent of dairy farmers were working more than 50 hours per week; only 29 per cent of the New Zealand working age population worked more than 50 hours per week (Fursmann 2008). The industrial norm for all workers has remained 40 hours per week, with an average modal value of 40 to 49 hours in the 2006 Census.

Long work hours are a known risk factor for injury for those working in agriculture. Lovelock and Cryer (2009) looked at the implications for health and safety from long hours and consequent fatigue. Sub-contracting, common in dairy farming, was 'a practice associated with poorer occupational health and safety conditions' (Lovelock and Cryer 2009, p. 15). Seasonal workloads or machinery breakdowns increased time pressures and were identified as major stressors. The most prevalent barriers to safety reported in Lovelock and Cryer's (2009, p. 16) studies were 'having to rush and being tired and/or fatigued', which could be added to by pressures from other people.

There are alternative strategies that could reduce the working hours of dairy farmers. OAD milking led to more sleep, feeling more rested and able to work, with less rush and less stress. OAD also gave more flexibility around when and how to do things, which equalled more logical organisation as bigger blocks of time were available, helping get jobs completed, giving more job satisfaction, better quality farming, and a safer farm environment (Verwoerd and Tipples 2007). However, OAD was not an acceptable strategy for most dairy farmers and Fonterra. Only milking OAD was not being a 'real dairyman'. OAD protagonists felt under siege from the TAD core, when observed at the 2007 Once-a-Day Milking Conference in Hamilton (LIC 2007). OAD is almost only chosen by dairy farmers who own their own property. Sharemilkers are forced to be production focused by their contracts (Gatley 2010).

Kyte (2008) suggested increasing the use of wage labour to reduce fatigue and increase efficiency in dairy farming. For a 600 dairy cow unit, he calculated the financial cost at NZ\$50,000 per labour unit, but the extra labour unit would benefit all. It would reduce working hours and free managers to train staff and introduce new farming systems, and allow everyone to do other things such as sport or recreation and put family first. Kyte (2008) concluded his idea had promising potential outcomes for a counter cultural business strategy but 'To introduce more labour into the system you must be able to capture increased productivity' (Kyte 2008, p. 11). This idea we now call 'Kyte's Paradox', you have to spend more on waged staff to reduce individual farm staff's hours of work and thus fatigue, and to increase productivity.

Dairy safety and health

Dairy farming is a dangerous industry. All active accident claims for 'Agriculture' cost the New Zealand Accident Compensation Corporation (ACC) NZ\$59 million for the financial year ending 30 June 2010. Of the claims, dairy farming accounted for NZ\$24 million (41 per cent) of that for 48 per cent of the total farm workforce. New dairy farming claims for accidents to ACC have been falling, but because of previous accidents with on-going injury claims, the proportion of active claims from dairy farming was increasing at approximately 1 per cent per year (1 July 2004 – 30 June 2009) (Tipples 2011). Only then did the overall accident expenditure begin to fall, so it may be argued that Health and Safety initiatives were beginning to have an effect. Perhaps the new Agriculture sector action plan implemented by the Ministry of Business, Innovation and Employment will help to reduce claims further (Department of Labour 2012). Lovelock and Cryer (2009) caution that farmers are very resistant to Occupational Health and Safety (OHS) initiatives they have not been party to, which explains why many previous initiatives have been unsuccessful.

Our accident incident analysis

While dairy production has been growing, the industry has also been undergoing structural changes. Much of the new production has come from the South Island (e.g. Canterbury, Otago and Southland) where land for dairying has been cheaper. Consequently many traditional North Island dairy farmers have been able to buy larger farms. The average New Zealand dairy herd size has increased from 285 in 2002/03 dairy season (LIC 2003) to 393 for 2011/12 dairy

season (LIC 2012). In dairying growth areas, average herd sizes are bigger; North Canterbury has an average herd size of 773 and Southland 559 (LIC 2012).

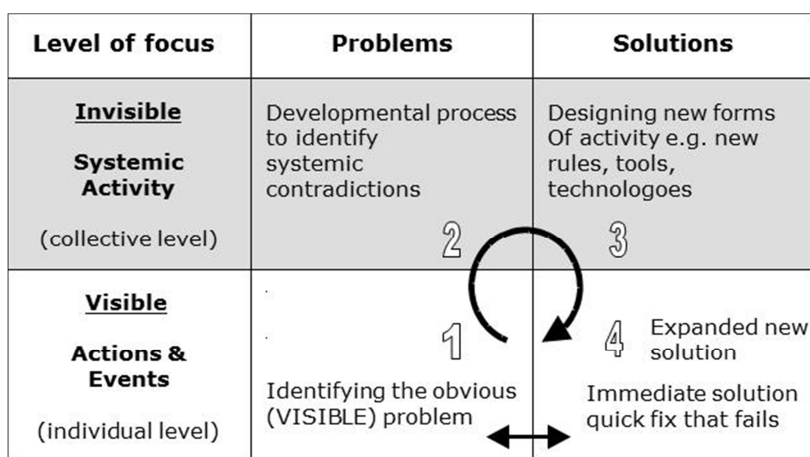
In earlier research it was found that there was a positive correlation between increasing herd size and an increasing number of ACC claims/accidents. These accidents tended to peak in Spring at the busiest season at calving, then decline and level off in Summer, with the lowest levels being in June in Winter in the 'dried-off' season (Tipples and Greenhalgh 2011). In terms of time of day there was a bimodal distribution, with peaks at: 09.00 to 11.00 and 14.00 to 16.00, or just after breakfast and after lunch. In terms of age, accidents peak for 20-24 year olds, when there is perhaps a mismatch of confidence/maturity, and for 35-39 year olds, who are perhaps stressed/tired managers, sharemilkers or equity partners, or migrant dairy employees who are typically of this age range (Tipples and Greenhalgh 2011). It is however difficult to attribute accidents to fatigue due to a lack of appropriate data gathered. Anecdotally spring calving is the time when fatigue levels are at their worst.

Research gaps and the research approach chosen

The knowledge gaps outlined above impede studying problems of fatigue in the dairy farming labour force, particularly its composition and culture, which is very resistant to change. As part of DairyNZ's Farmer Wellness and Wellbeing programme (2010), a research project was designed to examine the problem of fatigue in dairy farming using three different dairying regions: Canterbury and Southland regions in the South Island, both new areas of large scale dairy farming, and the Waikato, the heart of traditional New Zealand dairy farming.

An inter-disciplinary expansive learning approach based on a Finnish 'Change Laboratory' process (Engstrom 1987; Seppänen 2000) was chosen as the research approach. It had been used successfully by WEB Research in the development of the Recognised Seasonal Employer policy for horticulture and viticulture in New Zealand to resolve key seasonal labour shortages. In this case a similar range of complex interacting factors came into play and an industry change of culture was seen to be needed (Hill et al 2007). WEB Research was, therefore, contracted to undertake the project and initiate the expansive learning approach advocated (Figure 1).

Fig 1 Managing change using an expansive learning cycle



Source Hill et al. 2007

Method

The main research activity of the research process described in Figure 1, are the Change Laboratories (Change Labs). The Change Lab process is designed to motivate the collective generation by participants of novel solutions to intractable barriers to altered behaviours. The research process hinged on participants deciding what the underlying systems issues related to dairy fatigue were and then developing and implementing their own industry based systems solutions. Participants are therefore active operatives in the expansive learning process. The researchers have a dual focus as the facilitators of the process, providing new resources and helping to focus discussions. The key unit of analysis was the individual dairy farming activity, with the farming system at the centre.

The research process incorporated:

1. Phase 1 (2011)

Fieldwork (or ethnography), and background literature review and data analyses, to gather socio-cultural historical data on the full range of activities that make up Canterbury dairying system, on- and off-farm, based on Cultural Historical Activity Theory (CHAT).

2. Phase 2 (2012)

Eight to ten Change Lab workshops to:

- Identify opportunities for long-term systemic change.
- Reframe the mental models, practical tools, policies, based on Developmental Work Research (DWR).

3. Phase 3 (2012-13)

Trials, active engagement to build a commitment and mechanisms for roll-out to both the dairy industry and rural health sector.

Our participants have been very supportive of the process and activity, but due to important events in the dairying calendar there were difficulties getting them all together every time in Canterbury on a 3 week cycle from February to August 2012.

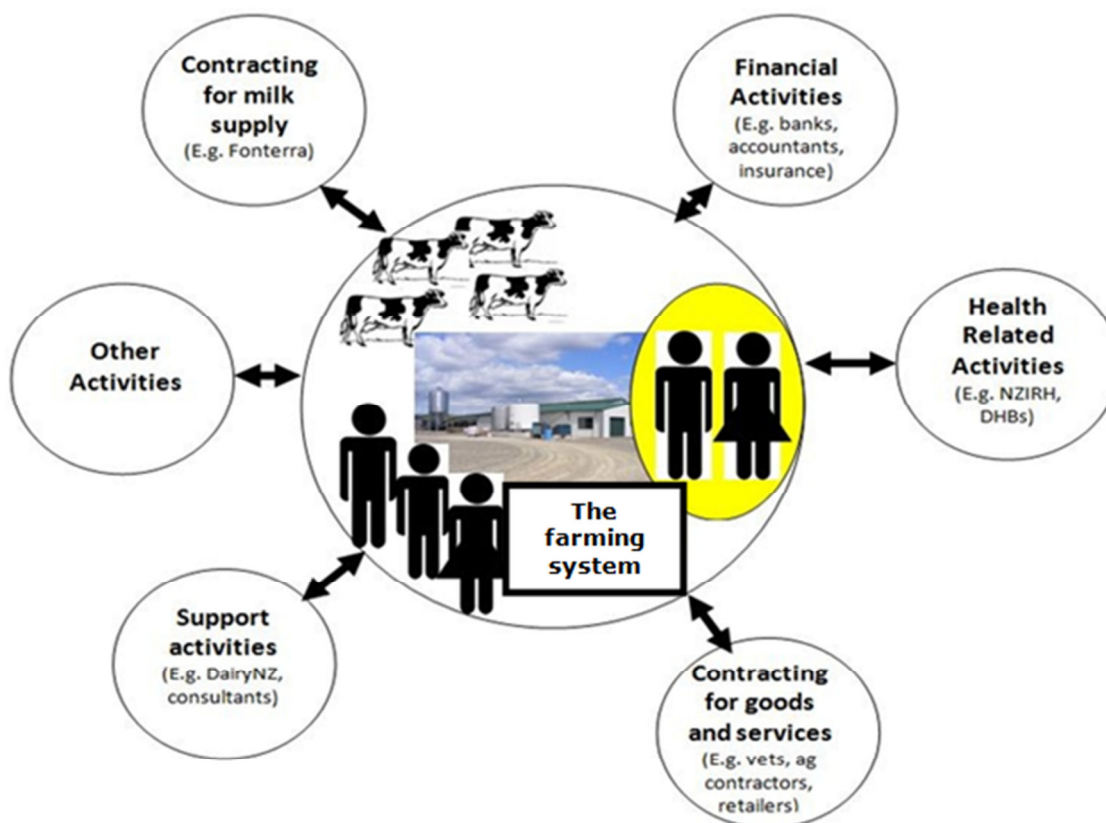
What we did in Canterbury (2011) – initial results

The Change Lab participants came largely from those interviewed in the first phase of the study in 2011. This had involved interviewing 30 participants who were typical of Canterbury dairying both on-farm and off-farm (see Figure 2).

We visited a range of farms in January, May and June 2011 in Canterbury with a range of farming technologies to give a broad picture of current Canterbury dairy farming. We interviewed dairy farmers, sharemilkers, farm employees and supervisors. We also interviewed those working off farm including: DairyNZ Consulting Officers, a Fonterra representative, a banker, an accountant, a vet, an irrigation specialist and health professionals. We heard of overwork, work-related stress, injury and clinical depression. Throughout the process, we tried to triangulate on and off-farm data to ensure its validity. Several themes were distilled from the initial enquiries and then fed into the Change Lab process as required to stimulate the participants' discussions. This was an interactive process with blurred margins between the different stages. Some of the emergent themes and thoughts are presented here:

- What motivates dairy farmers, sharemilkers, herd managers to work 16-19 hour days, weeks on end; and, from July – December, with no meaningful break? One answer: young, highly-motivated, entrepreneurial men and women are building complex, demanding pathways to find a route to farm ownership.
- Taking on large debt creates 'a huge amount of pressure' when combined with farmers' attitudes to risk, and a lack of business and financial skills.
- Corporate pressure, investors' expectations are leading to a new trend away from '*farming animals to farming land*', with less importance given to animal husbandry and staffing issues and more to '*the bottom dollar*'.
- With '*more cows, more land, more irrigation*', supervisors have '*more to do*' including managing more people and a more diverse workforce, e.g. herd managers and workers with English as second language.
- The long daily hours and rosters in dairying impacts on quality and productivity of work. For example, when working 11 days on and three days off, we heard by the seventh day '*people start fading*'.
- Relationship stresses between dairy farming couples appear inextricably tied up with the business and work practices of dairy farming.
- Industry pressure to be highly productive, manage debt and to be seen to be a 'successful operator' can have a negative impact on farmers' self-esteem as they participate in bench-marking exercises and compare themselves, unfavourably, with their peers. This stress can lead to lowered productivity and depression.

Fig. 2 Dairy farming activities represented at the Canterbury Change Laboratories in 2012



The Canterbury Change Lab (2011) –later results

In their stories and dialogue so far, the Change Lab participants have mapped the mental models and practices of the farmer(s), farm family and employees, as well as those who influence on-farm activity, in dairying activity in Canterbury in this new environment.

Participants have provided detailed accounts of their direct and indirect experiences of fatigue and stress on Canterbury dairy farms, ranging from those involved in financial activity in the sector (rural banking, insurance and accounting) to the activities of farm owner-operators, sharemilkers, farm managers, operations managers and employees. Participants described aspects of Fonterra's activities from their experiences as farmers and interactions with the company and other related organisations. DairyNZ consultants and staff have talked about their roles, experiences and practices in the industry, particularly in Canterbury. Department of Labour staff have also described policy and regulatory activity on the topic of fatigue, stress and accidents on-farm.

The activities of the Dairy Women's Network and Young Farmers' Network were also mapped (although they had no members in the laboratory), based on discussions within the Change Lab sessions and outside these sessions, either in the fieldwork phase or in informal discussions.

Building on the Phase 1 ethnographic findings, using a 'mirror' paper reflecting what had been found, the first four Change Lab sessions laid the foundations for participants' later design of long-term systems solutions to the fatigue, stress, accidents and injuries, which were intended to change mental models and practices both on and off-farm in the industry. The fifth change lab session built on these foundations, enabling WEB Research to complete the first cut of a socio-cultural historical analysis of dairying in Canterbury. Such analysis suggests that some of the core cultural values, practices and behaviours of the earlier farming form (family farming) have been preserved in subtly altered ways in the mental models and practices of new forms of 'farmers' who have created a new, industrialised form of dairying (scale farming). At the same time, these mental models and practices have been shaped by off-farm activities ranging from

the contracting of milk supply, acculturating newcomers to the industry, ‘disciplining’ on-shore industry around optimising production and farming effectiveness and efficiency and so on.

In the sixth Change Lab session, which was held at the end of Year 2 of the contract (May 2012), participants examined in detail the differing career pathways of those entering, or in, dairying with the goal of owning a farm, and those who do not have that goal. We looked at the on-farm and off-farm mental models and practices that underpin those two pathways, and possible connections with the fatigue, stress and incidence of accidents and injuries that are prevalent in Canterbury dairying. Two more Change Lab sessions were held in Year 3. The participants worked in two groups to identify elements of possible future systemic solutions for adoption by dairy farmers, the dairy workforce (including their families), as well as by other industry stakeholders including Fonterra, DairyNZ, rural finance and other farm advisers, rural health professionals, and farming communities.

Synthesis of current cultural-historical state of Canterbury dairy farming

In the Change Lab discussion and analysis it was evident that the referent of the terms ‘dairy farmer’ and ‘dairy farming’, as culturally and historically constructed, are altering. The mental models, tools, own rules, a community of practice and division of labour of what might have been understood to be a traditional dairy farm, and dairy farming, are all taking on new forms, which appear to include:

- A traditional dairy farm supporting the lifestyle of one or two families; such is typically owned by baby boomers who have not yet yielded ownership or control. Some steps towards the involvement of the next generation may have been taken.
- A form of dairy farming characterized by a single family ownership but arrived at not through inheritance but as the result of 10 to 15 years of single-minded hard work along the path to ownership.
- Dairy farming but no expectation of ever achieving ownership.
- Scale dairy farming using a range and mix of ownership and investment forms.

The point here is that the cultural and historical constructs for justifying and rationalising some of the industry’s habits and practices can no longer be relied on to ‘discipline’ the people working in the industry, and the industry itself. The possibility of dairying as a sustainable and enduring way of life has diminished in the face of a focus upon production, science and the use and management of debt finance.

If there had been a time when the farmer and employee could have been said to have had a shared object (endure because you are on the path to ownership - one day you will be like me), then that is no longer the default case. Was it possible to construct a new, mutually agreed, shared object between the farmer activity system and the employee activity system? The people in the room came up with suggestions for actions that might lead to the construction of a shared object between a farmer and an employee. A shared object might enable a shift from the current outcomes to future outcomes.

Fig. 3 Possible current and future outcomes of the Change Lab process.

Current outcomes	Future outcomes
Increased profits	Increased productivity
High levels of fatigue and stress etc.	Reduced stress and fatigue
‘Dirty dairying’	‘Decent dairying’
Relationship break-ups	Mutually beneficial productive farm

Where was the research at the end of May 2013?

The Change Lab cycle was completed during spring calving in September 2012, with a surprisingly well attended meeting in Ashburton in spite of the busyness of the season. We believe this was a show of the group’s confidence in our process, further exemplified by the desire to achieve a concrete outcome from the previous deliberations. The group focused on three questions at the Ashburton meeting and tried to develop tools to help farmers create the new shared object.

The key questions were what characterised what a decent dairy farm had, and did, and what characterised decent employees. The features of a decent dairy farm were thought to include good accommodation (e.g. comfortable, well maintained, safe, warm and well fenced); good working hours and/or rosters (e.g. fair, regular time off, negotiable and with enough

employees); and a safe working environment with an active Health and Safety plan, hazards map, relevant training and appropriate safety gear. It was also thought to promote good leadership, with employees knowing the targets of the business, and fairness, such as everyone getting home on time. Clear expectations were another feature. In terms of rewards, a decent dairy farm was believed to let employees know when they had done well, to provide job variety and flexible rosters, and to offer the chance of increased responsibilities.

Decent dairy farm employees could first explain why they wanted to work on their farm and knew what that required. They are healthy: physically, emotionally and psychologically robust and drug free. Some work experience was seen as good, but not essential. If they were in a relationship, valuing family life is seen as important as well as being house proud.

Detailed results are still emerging and we do not want to prejudge what the Change Lab team will eventually agree to trial and implement. But we are very encouraged by the seriousness with which all participants have addressed the subject in Canterbury of 'dairy fatigue' and sought realistic ways to alleviate the problem. Now we have also conducted the ethnographic study of Waikato dairy farming and our first four Waikato Change Laboratories. We are finding a longer established more traditional dairy culture in contrast to Canterbury's. Our research programme continues. Whether or not Waikato dairy farmers will pursue a path to 'decent dairying' remains to be seen?

Conclusions

Stress and fatigue remain considerable impediments to the welfare and well-being of dairy farmers, their families and their employees, and inhibit potential productivity gains from a happy, healthy and safe working environment. These factors also contribute to staff turnover creating a cycle of stress for the farmer which is currently difficult to break. The result creates a negative image of the industry, affecting the recruitment of quality staff.

The Change Lab process offers a way in which those within the industry can describe and make visible to others from their industry their existing private mental models, and describe how these models shape the way in which they, and the collective industry, behaves. The focus on the farm activity system enables the participants to test the potential outcomes of suggested changes against their knowledge and experience of 'what works' to determine whether they will achieve the desired outcome of reduced stress and fatigue, or merely result in the 'sticking plaster' outcome that so often happens when we attempt to fix systemic problems.

The greatest benefit of the process is that it is driven by the farmers themselves and is not imposed on them or offered as yet another well-formed tool to apply. The developmental work research process stimulates expansive learning cycles within which any activity/action designed is applied in a small way and gradually expanded as it is trialled, assessed and amended prior to further re-trialling. This cycle of developmental and expansive learning ensures that the eventual larger scale action is more likely to be accepted by the industry.

The expansive learning (research) process is very dependent on the mix of people involved and the construction of their motivation to alter their existing behaviours. The Change Laboratories themselves require a significant time commitment from the participants and it is essential that the research process engages and rewards the participants' commitment. The process is hindered by the demands of the dairying calendar which removes blocks of time for Change Labs and interaction, potentially reducing commitment and affecting the project's progression. As outcomes cannot be predicted in advance, it requires an act of faith on the part of funders.

The Canterbury project has advanced to the stage of designing a system around the concept of decent dairying that the participants believe will help to attract and retain quality employees. Canterbury farmers identified labour churn as their key source of stress and fatigue. The Waikato project is still in the Change Lab process; it is not yet possible to imagine the outcomes. The Southland project has been put on hold at the current time.

The Change Lab is based on the work of Engeström and his colleagues at the University of Helsinki, Finland, who developed a theory of adult learning (see for example Engeström et al. 1996; Virkkunen and Kuutti 2000). The process requires experienced and skilled facilitators if it is to produce sustainable solutions to industry problems and to speed up culture change. The role of the researchers is to guide and support the process by ensuring the theory of expansive learning is applied systematically and to feed in any relevant knowledge based on current research, but the solutions and possible altered behaviours are driven by those actually working within the industry.

The Canterbury laboratories suggested that concerted action by farmers in a network working alongside a pool of labour that, with the farmers, had created a shared object, could result in

innovations in labour supply such as to reduce churn. As well, the Canterbury laboratories suggested that the barriers to altered behaviour in the dairy industry are profoundly embedded, readily reinforced and extremely resistant to challenge. The focus of the Waikato laboratories has been on understanding why the barriers to altered (safer and less stressful) behaviour on farms and across the industry are so difficult to overcome. This remains a work in process.

What has emerged is that the theory and practice of extension in the dairy industry, the theory and practice of innovation in social or socio-technical systems, and the theory and practices of intervention in farming systems need a substantial reconsideration. A fundamental research question to emerge is why the large investment in science, extension, support, guidelines and regulation appears to leave farmer individual and collective behaviour unaltered. The laboratories are generating some insights into this question.

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