KELLOGG
RURAL LEADERSHIP
PROGRAMME

Farm system influence on dairy workforce retention.

Kellogg Rural Leadership Programme

Course 47 2022

Braydon Schroder

I wish to thank the Kellogg Programme Investing Partners
for their continued support.

Disclaimer

In submitting this report, the Kellogg Scholar has agreed to the publication of this material in its submitted form.

This report is a product of the learning journey taken by participants during the Kellogg Rural Leadership Programme, with the purpose of incorporating and developing tools and skills around research, critical analysis, network generation, synthesis and applying recommendations to a topic of their choice. The report also provides the background for a presentation made to colleagues and industry on the topic in the final phase of the Programme.

Scholars are encouraged to present their report findings in a style and structure that ensures accessibility and uptake by their target audience. It is not intended as a formal academic report as only some scholars have had the required background and learning to meet this standard.

This publication has been produced by the scholar in good faith on the basis of information available at the date of publication, without any independent verification. On occasions, data, information, and sources may be hidden or protected to ensure confidentially and that individuals and organisations cannot be identified.

Readers are responsible for assessing the relevance and accuracy of the content of
this publication & the Programme or the scholar cannot be liable for any costs incurred or arising by reason of any person using or relying solely on the information in this publication.

Scholar contact details may be obtained through the New Zealand Rural Leadership Trust for media, speaking and research purposes.

CONTENTS

Tables:

Figures:

Glossary and Abbreviations

This section presents some terms and acronyms that are commonly used through this report. It is recognised that definitions for these terms may vary in other research and contexts.

Farm system	All of the elements that make up a specific farm system. It includes but is not limited to HR practices and soft skills.
Aspects/elements /features of farm system	The individual aspects that combine to make a farm system. Including, but not limited to cow numbers, staff numbers, farm size, cowshed type and size, number of paddocks, feed system and methods, machinery used, infrastructure, installed technologies, calf rearing and youngstock grazing, wintering/dry period methods, fertiliser, calving and mating procedures, fencing, water system, effluent, irrigation, compliance, financial, animal welfare, environmental or cultural values, location, climate, milking frequency, rosters, HR and H&S.
Soft skills	This term is used to abbreviate one's personal attributes to interact effectively and harmoniously with people including training, building team culture, leadership, communication, empathy and language skills.
HR (human resources)	Includes the direct people management tasks within any business. For this research, HR excludes the activities the employee does as part of their job, but includes the processes associated with hiring and managing staff
NZ dairy sector	New Zealand farms milking bovines that supply dairy product to a processor or straight to market.
US	United States
Retention	The actual time an individual stays within a farm business or the NZ dairy sector.
Labour/workforce	The members of the farm team or NZ dairy sector needed to sufficiently complete all tasks required to effectively operate the farm or all farms in the sector.
FTE (full time equivalent)	Is a unit that indicates the number of hours a person would be expected to work in a full-time employment role. This number of hours per FTE can range depending on the specific sectors definition used. Although this has been questioned and challenged several times in the dairy sector, for the purpose of this research, 1 FTE is equivalent to 2,400 hours worked per year or 48 weeks at 50 hours per week.

Executive Summary

There is significant difficulty faced by dairy farmers and the NZ dairy sector, particularly when attracting and retaining quality employees (Rolfe, 2017). The challenge of retaining talent and passion on NZ dairy farms is familiar for many. A surveyed 49% of farm assistants on NZ dairy farms leave their employment in less than one year from starting (Federated Farmers & Rabobank, 2022). This is not sustainable for the dairy sector moving forward due to the associated financial burden and wellbeing concerns generated from high turnover on NZ dairy farms.

There is an abundance of literature and findings recognising the "soft skills" and human resources ("HR") that can be altered to improve job satisfaction and retention in the NZ dairy sector. However, there is limited progress made on reducing overall turnover in the dairy sector over the last 10 years. There is a gap in the literature, for the NZ dairy sector, among other sectors, considering how aspects of a farm system may influence employee job satisfaction and retention, why this may be the case and how valid solutions can be implemented.

This research is important given the current unsustainable turnover in the NZ dairy sector and the lack of progress seen at sector level in improving turnover statistics over the past decade.

To answer these research questions qualitative data was collected via a review of literature and 13 semi structured interviews. Each interviewee was unique as they either had a different role or set of responsibilities. They were from different nationalities or backgrounds, had a wide range of farming experiences and were working on very different farm systems to one-another. As a farm systems consultant I have also been able to draw on my experience working with a range of farm businesses to inform the development of research questions as well as associated research and solutions.

A thematic analysis was then conducted between the literature review and the interview findings. Common and contrasting themes were evaluated and conclusions were made from these findings. Some of the **findings** included:

- Various difficulties within a system build on one another having more of a multiplied, rather than summative, influence on job satisfaction and retention of NZ dairy farm employees.
- Actual tasks required to be completed are not necessarily what influences an employee's job satisfaction and retention. There may be more effective improvements in job satisfaction and retention on NZ dairy farms if focusing on the internal task efficiencies, performance factors related to these tasks and ensuring the purpose of tasks are well understood by employees to then be able to include them in successive decision making.
- Understanding an individual's strengths and passions before employing, or at the early stage of employment, will guide specific responsibilities best to provide this individual to improve their job satisfaction and chance of staying within the farm team.

Recommendations were then formed from these conclusions for individual farmers and the NZ dairy sector and are as follows:

For Farmers:

- Consider examining each part of your specific farm system with all team members separately to gain understanding of the potential difficulties they may be facing.

- Investigate job preferences of your farm team members and specifically any solutions they may have to the difficulties found within the system.
- Examine each individual's strengths and passions before employing to guide their most suitable responsibilities and improve their job satisfaction and retention in your farm team.
- Commit to explaining the purpose (the "why") of all aspects of the farm system and policies implemented on farm to employees to improve their engagement and satisfaction in the business and improve the chance of retaining them in your business.
- Complete and understand your specific farm's total investment return and cash flow implications of any proposed change in your farm system.

For the NZ dairy sector:

- Showcase the "top performing farmers" as case studies online to inform the rest of the sector what system adjustments have helped, how they have been implemented and how they are continuously managed to improve staff satisfaction and retention.
- Commit to investigating more independent farm case studies to uncover further solutions and connections between farm systems and employee retention.
- Investigate the investment return and other benefits of various technologies discussed in this research along with other technologies or procedures available.
- Develop further farmer decision-support tools to be created to evaluate the economics of adopting new technologies on farms and allow for comparison with other technologies.

Acknowledgements

Over this Kellogg journey there is several people I would like to acknowledge. Firstly, I would like to thank The New Zealand Rural Leadership Trust for the amazing work put into organising the programme. Phil Morrison, Chris Parsons, Patrick Aldwell, Lisa Rogers and Annie Chant – thank you for setting a thought-provoking course along with a platform for continuous reflection and networking opportunities which empowered further learnings on the programme. I would like to thank all presenters on each phase of the programme.

I would like to thank the Agricultural and Marketing Research and Development Trust ("AGMARDT") for your financial support. Your generosity has allowed me to complete this programme.

I would like to thank my professional networks that added perspective and discussions around my project findings. This includes all the farmers, their farm teams and rural professionals in the dairy sector that I interviewed - thank you for your contribution. Your opinions, ideas and passion for the sector and your farm teams was rewarding to capture and I wish you all the best to grow and prosper in what may lay ahead for you all.

I would like to thank my employer Perrin Ag Consultants for providing me the time and support to complete this programme and research project.

Lastly, I would like to thank Kellogg Cohort 47 ("Kovid 47"). Being inspired together and on this overall learning journey together provided valuable reflections and a lift in enthusiasm knowing there is a team of us, and we are not completing our projects alone. The friendships and memories made with you all I will truly cherish for many years to come.

1 Introduction

There are significant challenges faced by farmers and the NZ dairy sector, particularly when attracting and retaining quality employees (Rolfe, 2017). The issue of retaining talent and passion on NZ dairy farms is familiar for many. A surveyed 49% of farm assistants on NZ dairy farms leave their employment in less than one year from starting (Federated Farmers & Rabobank, 2022). This is not sustainable for the dairy sector moving forward due to the associated financial burden and people wellbeing concerns generated from high turnover on NZ dairy farms.

As a farm systems consultant, the significance of retaining employees for the mental and physical wellbeing of others in the farm business and the associated financial burden with high staff turnover is extremely evident (Seglias Winship Limited, 2008; DairyNZ, 2022d; DairyNZ, 2022e). The unsustainable reality of the high staff turnover needs to be a priority for the NZ dairy sector among the other challenges it faces. Having a sector that can attract and retain talented and passionate employees will also help farms and the sector to overcome other challenges and as Miller (2021) suggests result in considerable savings to a business.

For many farmers that are unlikely to change their soft skills and ways of working with people (regardless of if it is likely to help their staff retention), looking at how their farm system may influence their farm teams job satisfaction and retention may be an alternative starting point for some. It is important to note that this is only one part of the puzzle and improving soft skills and HR practises are likely significant pieces to the overall puzzle. Many dairy farm owners in NZ get professional support in order to best design their farm systems to achieve their goals as an owner. Understanding the aspects of a farm system that mitigate the risk of employee turnover is extremely valuable in this process.

The NZ dairy sector has made considerable improvements in understanding the underlying issues causing this retention issue. There is an abundance of literature and findings suggesting the "soft skills" and human resources that can be altered to improve job satisfaction and retention in a farm business and the dairy sector (Eastwood et al., 2018a; DairyNZ, 2022a; Eastwood et al., 2022; CIPD, 2021; Moore et al., 2020; DairyNZ & Federated Farmers, n.d.). However, there seems to be limited progress made on reducing actual turnover in the dairy sector over the past 10 years (DairyNZ, 2021a). There also tends to be a gap in literature, for the NZ dairy sector, other NZ sectors and international dairy sectors, on how aspects of a farm system may influence employee job satisfaction and retention, why this may be the case and how valid solutions can be implemented.

2 Project Scope, Aims and Hypothesis

2.1 Project scope

The following overarching questions prompted this research:

What aspects of a NZ dairy farm system influence employee job satisfaction and retention?

Why are these aspects influencing employee job satisfaction and retention?

How might valid solutions be implemented in NZ dairy farm systems to combat this issue?

The intent of this project is to answer the research questions through conducting a literature review and interviewing a range of people in various roles within different types of NZ dairy farm systems.

Due to the scope of this research, not all features of the farm system are assessed in detail. As can be seen in Appendix 1 the interview questions ensured all aspects of the farm systems were discussed, however this project prioritised analysing farm system aspects that were considered the most influential. This report highlights the themes between the literature and interview responses regarding specific features of the farm system that were recognised as most influential on the job satisfaction and retention of farm employees in the NZ dairy sector.

This report assesses how farm system features impact job satisfaction and retention of all parties within the on-farm teams of NZ dairy farms. It takes a particular focus on entry level workers (e.g., farm assistants, herd managers and milk harvesters). This particular focus is due to the significant retention problem recognised in the NZ dairy sector for this distinct skill level of workers.

Financial analysis of the various system change options were not completed due to the limited project timeframes and scope.

2.2 Research aims

The aim of this research project is to understand:

i. Themes within NZ dairy farm systems that influence job satisfaction and retention of individuals in the workforce.
ii. Why certain processes and technologies implemented in farm systems influence job satisfaction and retention of individuals in the NZ dairy workforce.
iii. What can be implemented and transferable in NZ dairy farm systems to improve job satisfaction and retention of individuals in the workforce.

2.3 Hypothesis

The hypothesis from personal experiences prior to completing this research was that certain efficiencies within a farm system would each have an influence on the job satisfaction of employees and subsequently play a role in retaining them in a farm business. This does not mean that employers can neglect soft skills and HR processes, but that farm system aspects and design can also support job satisfaction and retention as a part of the larger puzzle.

Due to the difficulties seen in my personal and work experiences, I understand how critical it is to attract and retain the right people into farm businesses. In addition, I believe there is a moral obligation to retain good people in the industry for the wellbeing of all people involved in the farming sector. I

understand and have seen the financial burden to a farm business when they lose staff they would like to retain. Staff retention and recruitment is a key reason clients work with consultants to help fill gaps within their farm businesses. This is generally due to either being understaffed, individuals lacking adequate technical training or helping businesses recruitment processes.

Often, I am working with the employer or manager of people in farm businesses rather than the farm workers that are leaving due to the nature of the position. My viewpoint is influenced by the life experiences I have had, the people I know and clients I have worked with. In relation to the project questions, my perspective is that there is plenty of resources explaining the soft skills, the training and culture that can be developed on a farm to retain staff, yet many farmers (usually those that have been farming for a longer period) don't seem to take notice of these solutions and either ignore or believe that they have nothing to improve on in these areas. These farmers may find these things too difficult to change after doing it a certain way for so long.

This makes me wonder what physical farm system changes or structures may encourage more people into the NZ dairy industry and retain more people in these farm businesses. This thinking leads me to consider if certain farm system aspects such as feed production systems, milking frequency, animal performance and welfare, location and layout of the farm, farm infrastructure and machinery, environmental position and health and safety of people on the property as examples may influence job satisfaction and staff retention. My thinking is that all these features of a farm system are a component of the bigger recipe for high farm staff retention.

I could back the issues of wellbeing and financial burden to a farm business with academic, industry and own data to prove their truth, however, to back any statements of farm systems features influencing labour retention, I would need to review the literature and source data from others with first-hand experience within the sector. I have chosen to focus my project on this aspect so advice and discussions had by all stakeholders of the NZ dairy sector, including myself, can be more informed of the potential solutions and implications to labour retention from implementing various system changes.

3 Methodology

3.1 Overview

Qualitative data was collected via a review of literature and 13 semi structured interviews. A thematic analysis was then conducted between these information sources as well as through my own observations in my role as a farm systems consultant. Conclusions were made from the findings and recommendations then formed for farmers and the NZ dairy sector.

3.2 Rationale behind methodology

There is an abundance of organisations and researchers that could be considered stakeholders in this research question. Therefore, it is important to identify what information was existing out there in literature, both academic and non-academic research. Understanding the existing literature when carrying out the interviews allowed for open questions beyond the questionnaire guide, seen in Appendix 1, in order to better compare with what was found in literature.

A qualitative research approach was taken as it allows detailed data to be produced that would otherwise go unnoticed in quantitative research (Braun & Clarke, 2006). Muller & Schroder (2022) recommend further in-depth analysis into top performing businesses (according to their recommended staff retention metrics such as "proportion of new entrants remaining on a dairy payroll after 12 months of employment") to help understand the next steps to improving retention on NZ dairy farms. These reasons are why the semi-structured interview approach was taken compared to alternative data collection methods in order to capture the details of a range of personal experiences to find the next steps for improving on farm staff retention. It was felt that an online survey with closed questions might reach a larger sample, however it would not allow for rich discussion on non-quantifiable factors.

A thematic analysis was conducted due to its suggested flexible approach to analyse qualitative data (Braun & Clarke, 2006). Themes were identified as common or contrasting across interviews and/or the literature and then evaluated.

3.3 Literature review methodology

The overarching research questions in section 2.1 and research aims in 2.2 were refined by identifying parts of this question that have been previously answered and where remaining gaps in literature existed. This also guided the project scope. By breaking down the research question, a topic question tree was developed (Appendix 2) to guide the literature review process.

Staff turnover, the implications of it, progress made on improving retention, current and future potential solutions to improving farm systems and in turn staff retention are explored, initially for the NZ dairy sector. These same sub questions were explored in other sectors in NZ and in international dairy sectors to then be compared with the NZ dairy sector. Due to scope of this project, unfortunately not all the topics in Appendix 2 were able to be discussed in this project. The topics not discussed in this report may allow for further research opportunities.

3.4 Interview methodology

Following the literature review a questionnaire (Appendix 1) was developed to guide the discussions with each interviewee. In many cases, these questions led to stories of personal experiences as the questions asked were intentionally open-ended to capture as rich data as possible.

All interviewees prior to their interview were briefed as to the research purpose and the locations of the information they provided. All interviewees gave permission for their comments to be shared for the better of their farm businesses and the NZ dairy sector. All published information from interviewees is kept anonymous for their protection. Permission was gained to record each interview.

With the timebound nature of this project, the attempt to get a diverse range of perspectives and collect detailed responses to open questions led to semi-structured interviews with a sample size of 13 individuals. Each interviewee was unique as they either had a different role or set of responsibilities, were from different nationalities or backgrounds, had a wide range of farming experiences and were working on very different farm systems to one-another (excluding the one farm consultant interviewed).

Interviewees were targeted to ensure diversity of perspective. In line with this principle the following considerations were used in selecting interviewees for this research:

- Include at least one small scale farm and one large scale farm.
- Include at least one farm with a foreign work force and another with just NZ born employees.
- Include at least one farm system consultant.
- Include at least one owner operator, one sharemilker and one farm manager along with at least one of each of their employees due to each role having a different level of influence and control over farm system changes.

The interviewees consisted of one working farm systems consultant with over 20 years in this career and a prior 12-year career in training dairy farm staff along with four farm employers and employees each with different labour structures, farm scale and farm systems to one another. The positions of those interviewed separately consisted of one farm systems consultant, three owner operators, one lower order sharemilker, one permanent farm manager, one temporary farm manager, two assistant managers and four farm assistants. Only 3 of 7 employees were interviewed on the large-scale farm.

All these farm employers were recognised to either have high labour retention, unique HR implemented or have a range of technology and infrastructure to reduce total labour requirements and make the job for the remaining labour simpler and more enjoyable. All interviewees were sourced through professional sector networks.

3.5 Thematic analysis

Findings from the literature review and interviews are discussed and presented as identified common or contrasting themes in a summarised evaluated manner. Data was collated to provide potential solutions to the challenges identified in the themes. Conclusions were drawn from literature and interview findings and the critical analysis of these findings. Recommendations were outlined for the NZ dairy sector and individual farmers.

3.6 Limitations to this research

Limited time to complete this project limited the scope of literature able to be explored and the farmer interviews that were able to be conducted. Further scope for this research would allow more analysis on the research question including other aspects of a farm system not discussed in this research. This could include the investment returns and financial implications of any farm system technology or practise implemented by farmer case studies. If the scope allowed for more interviews, it would add more rigour and perspectives to the assessment made in this research. It may also prompt further conclusions from additional farmer experiences discussed.

4 Literature Review

4.1 The NZ dairy sector

The NZ dairy sector has changed drastically throughout the years and has had major changes in the number of cows milked and staff needed. In 1992/1993 season the total number of dairy farms was 14,458 (DairyNZ, 2021b). Herd size averaged 180 cows and produced on average 259 milk solids per cow (DairyNZ, 2021b). Fast forward to the 2020/2021 season and there are 11,034 dairy farms with an average of 444 cows per farm producing an average of 397 milk solids per cow (DairyNZ, 2021b).

The increased size and scale of dairy farms over time has been prompted from factors such as higher financial returns, irrigation infrastructure, improved data collection and automation technologies and higher operating expenses. This scale has also seen farms move from owner operator structures where owners are able to run the whole business by themselves to the average dairy farm needing to employ several people to keep it operating.

4.2 Staff turnover

Federated Farmers and Rabobank conduct an annual dairy farm remuneration survey and for the 2021/2022 season 36% of all employees were leaving their job in less than one year. Tragically, of farm assistants surveyed, 49% leave their employment in less than one year from starting. Based on all historical remuneration surveys conducted, the turnover has been volatile year on year although the past decade suggests an insignificant 5% decrease in overall turnover for employment being less than one year in tenure (Federated Farmers & Rabobank, 2022). Additionally, 23% of farm managers, who have much more responsibility and increased onboarding time required relative to the farm assistants, were leaving within one year of starting their positions.

From the same survey, these turnover rates compare poorly to the sheep and beef with 25% of employees leaving within one year and 31% of shepherds leaving within one year of starting a job (Federated Farmers & Rabobank, 2022). Despite labour turnover being higher than the sheep and beef sector, it appears to be lower than the US dairy sector (Matheson et al., 2022). However, the significance of labour could be considered more in NZ dairy systems given that the cost of employed labour accounts for an average of 21.3% of total operating expenditure on NZ dairy farms compared to 12.2% on US dairy farms (Beca, 2021).

Figure NZ (2022) utilised Stats NZ data to produce Figure 1, which hypothetically demonstrates the seasonal nature of worker turnover in NZ dairy farming correlated with the typical calving time in NZ. It is important to note that casual workers were included in this dataset which will be contributing to the high turnover in calving (when most casual labour is utilised). Figure 1 compares much lower turnover on average per year compared to Federated Farmers and Rabobank (2022). This may be due to a different sample of farmers used, a different sample size or accuracy of data supplied.

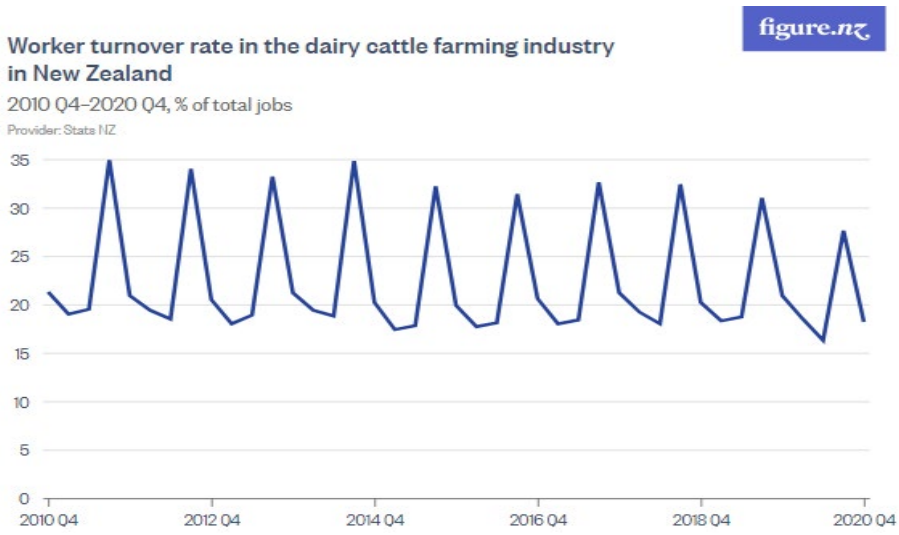

Figure 1: NZ dairy sector worker turnover (Figure NZ, 2022)

Figure 1 from Figure NZ (2022) aligns with DairyNZ (2022c) and Miller (2021) who state that the average turnover rate for NZ dairy sector is similar to other sectors. However, this still does not remove the challenge of 5,000 people leaving the dairy sector each year (DairyNZ, 2022c) and 49% of farm assistants leaving within one year of beginning their employment (Federated Farmers & Rabobank, 2022). Nor does it change the fact the undesirable turnover has a significant cost to farm businesses.

It is important to recognise that employee turnover can be seen as either "undesirable" or "desirable" to a certain business depending on several factors (Bhasin, 2019). On a dairy farm these factors can include, but are not limited to, years of service on one farm, growth potential and role/career progression for the employee, level of training behind an employee, ability to complete certain tasks or decision-making requirements, ability to remunerate an employee as much as another employer, goals and values misaligned, unfit for the position or employee breaching compliance or law. Essentially undesirable turnover is when the business does not want an employee to leave, whereas desirable turnover is when a business can improve outcomes through a staff member leaving.

4.3 The problem of high turnover

The implications of high turnover can result in several issues to NZ dairy farmers. Seglias Winship Limited (2008) estimates that the on-farm financial benefit from retaining a staff member for two years on farm compared to one year can provide a 25% 'productivity' improvement (in terms of operating surplus) after accounting for the costs of recruitment and induction. The financial burden of high turnover to an individual farm can be estimated via the DairyNZ labour turnover cost calculator (DairyNZ, 2022d). This uses the average salary of the employee leaving to estimate the total costs including recruitment, loss in productivity, loss in knowledge and skills, managers time engaging new staff, cost of errors by new staff, time spent on tasks not performed to standard expectation and on and off farm training. This financial burden can be significant and the true implication of this seems to not be recognised enough by some farmers. The total turnover cost calculations can equate up to the same amount as the full annual salary of an individual lost from the business. This does assume that the turnover was undesirable. Desirable turnover will have a lower cost, for example if the previous employee leaving was making significant costly mistakes, although will still encounter recruitment and onboarding costs.

A major implication not factored in with the DairyNZ cost calculator is the impact labour turnover has on the H & S, mental and physical wellbeing of employers and their farm teams whilst lacking adequate

members in the team to complete the workload (DairyNZ, 2022e). From experience in the sector this is common over the busy calving period on many NZ dairy farms. This can also have a flow on effect to other employee's job satisfaction and subsequently retention due to being overworked. Nelson (2021) suggests that small businesses can be particularly affected by turnover "due to limited resources and investment in employees". The financial burden (Seglias Winship Limited, 2008; DairyNZ, 2022) and farm team wellbeing concerns generated from high staff turnover on NZ dairy farms is not sustainable going forward.

4.4 Current sector resources and gaps

DairyNZ have made considerable improvements in understanding the underlying issues causing the sectors' retention issues. They have developed a range of resources to support quality workplaces and therefore help reduce undesirable turnover. The DairyNZ (2019) Spring Survival Guide suggests what farms should plan for, and complete, throughout the busy calving part of the season where Figure 1 suggests turnover can be highest. This discusses servicing all machinery and plant prior to calving, once a day milking, utilising tools such as "Facts & Figures" app, "Spring Rotation Planner Tool" and "BCS Tracker" app to simplify pasture/feed management and achieve target cow condition, preparing a calving kit and the calf rearing facilities and procedure and caring for sick animals. This guide also suggests the online tools for farmers to use including, "Healthy Hoof" app, "Farm Dairy Effluent Spreading Calculator" And "Farm Gauge". These resources provide some support and advice as to how a farmer can improve in various aspects of their farm system, however, no direct connection is made between the majority of this information and how it may impact the job satisfaction and retention of farm staff.

There is an abundance of literature and findings suggesting what, and how, "soft skills" and human resources can be altered to improve job satisfaction and retention in a farm business and the dairy sector (Eastwood et al., 2018a; DairyNZ, 2022a; Eastwood et al., 2022; CIPD, 2021; Moore et al., 2020; DairyNZ & Federated Farmers, n.d.). While the research and resources completed to date is incredibly valuable, there is still a lack of research on how farm systems factors can influence staff job satisfaction and retention. Eastwood et al. (2018a) agrees when they suggest that further dairy workplace research should "focus on the design and testing of new systems to provide people with meaningful work and a good lifestyle, without compromising profit".

4.5 Factors influencing staff retention

The job satisfaction of a team member is suggested to have a strong correlation with retention in a farm position or farm business (CIPD, 2021; Moore et al., 2020). Nelson (2021) found the same for those in the legal, accounting and regulatory sectors, along with Bhasin (2019) in the marketing and business sectors.

Moore et al. (2020) found that improved farm management increased employee job satisfaction. The efficiencies within a farm system are suggested to be correlated with the job satisfaction of farm staff (DairyNZ & Federated Farmers, n.d.). Improving dairy workforce productivity will help reduce the relative requirement for staff, save on labour costs (Riedel et al., 2001), and likely correlate with improving overall farm productivity and staff satisfaction (Lamm et al., 2007).

As discussed, some farm practices and increased farm efficiencies can influence job satisfaction and sequentially improve retention. Therefore, better understanding these opportunities and how they may be implemented within a farm system could develop the next steps to improving satisfaction and retention in farm businesses and the NZ dairy sector. This research intends to fill this literature gap.

4.6 Progress made to improve farm efficiencies and staff retention

DairyNZ (2021a) suggests that peak cows milked per full-time equivalent (FTE) has increased from 83 in 1990 to 146 in 2021. This trend is said to be driven from increased use of technology, larger dairy farm conversions and labour-saving techniques. However, when reviewing Figure 2 supplied in the DairyNZ Economic Survey, the last 10-year period suggests no overall change.

Figure 2: Historical cows per FTE (DairyNZ, 2021a)

Matheson et al. (2022) suggests cows per FTE is a "key metric" to use for measuring productivity of labour i.e. efficiencies on a given farm, thus this metric, when used alone, suggests the last 10 years have seen a halt in efficiency gains on NZ dairy farms. Figure 2 suggests the unsustainable rates of turnover on NZ dairy farms (as highlighted in section 4.2) are not being offset by improved on farm efficiencies. If neither of these factors are improving for the NZ dairy sector and given the negative financial and wellbeing implications associated with high turnover, there is significant opportunity to find practical and meaningful steps to implement on farms to begin changing this unsustainable trend.

4.7 Potential farm systems solutions in NZ dairy sector

4.7.1 Top performing farmers

Although minimal progress in labour efficiencies in the last 10-years are suggested in Figure 2, a report recently published in June 2022 "Great futures in dairying" written by DairyNZ suggests over the past 10 years "many farmers have identified, and proactively managed, the workforce issues seen in some parts of the sector today". DairyNZ (2022e) suggests these workplaces have implemented the following types of practices and behaviours:

- "Strategies to reduce the monotony of milking including changes in milking patterns such as once a day (OAD) or three in two (three milkings in two days) or the use of time-saving milking strategies, e.g., MilkSmart and milking only teams;
- Adoption of technology, such as Protrack, cow collars, and information management systems that make the job simpler and/or less labour intensive; and,
- Increased employee autonomy, particularly around roster setting (e.g., choosing the shifts you want to work / team members cooperatively deciding the roster rather than it being imposed by the manager)".

These adjustments do not necessarily have a direct influence on the satisfaction and retention of their farm teams. Muller & Schroder (2022) suggested farmers considered top performers in labour productivity (encompassing retention and satisfaction), should have an in-depth assessment completed to understand why these farmers may have improved outcomes. Penno (2005) indicated that these high performers will have the next steps to implement for improving job satisfaction and retention on other farms in the NZ dairy sector. Hence, it is essential for the sector to understand why these "top performing farmers" have benefited from specific system changes and how they have implemented and managed these changes to improve staff satisfaction and retention.

This "Great futures in dairying" (DairyNZ, 2022e) report does inform a plan for the NZ dairy sectors labour shortage and turnover which includes the following initiatives relevant to this research:

- Develop and accelerate adoption of automation in sheds and the wider farm that enhance the work environment.
- Encourage people-centred productivity strategies to improve productivity and hours worked.
- Evaluate different milking pattern benefits.
- Support farmers with a more flexible and novel approach to work design and role requirements.

4.7.2 Technological based solutions

Recent years have seen improvements in artificial intelligence, automation tools and app-based software along with greater use of communication technologies, the Internet of Things and automated pasture measurement to minimise farmers time spent on manual tasks and in some cases substitute labour requirements (Eastwood et al., 2018b). Research has shown greater use of precision technologies as herd size increases (Gargiulo et al., 2018). Although, technology uptake on farms to date have been limited, which according to Eastwood et al. (2016) is due to farmers not receiving "a clear value proposition" and a lack of "integrated solutions that clearly lead to better decision-making". With collaboration of sector and technology companies along with integration of current and developed technologies, it is believed this will provide a clearer value proposition and integrated solutions to reduce their labour requirements or improve their labour retention. The upfront costs and unknown cost benefit associated with these technologies may also be slowing down the farmer uptake of various technologies currently available. There may be an opportunity to investigate the cost benefit of the various technologies further to compare the options and aid implementation decisions of farmers.

In many cases these technologies may not only save labour time but also provide more data to improve decision making. This can subsequently lead to improved efficiencies on farm including but not limited to improved animal health, milk production, reproduction, feed on hand, pasture growth and forecasts, setting up paddock breaks and shifting cows through an app. Examples of some of these technologies include collar and ear tag technologies, sensor technologies, automatic drafting technologies, satellite pasture measurements. Very little literature investigates how these technologies as examples impact the job satisfaction and overall retention of farm staff. Eastwood et al., 2018b) suggests these technologies will make the sector seem a more innovative workplace for future employees, however, does not connect whether this could or not improve the satisfaction of staff. This is a question picked up in this research project.

Advances in automated oestrus detection have made it an attractive technology to help reduce manual oestrus detection labour on dairy farms. Thomas et al. (2019) found that the use of tested automated oestrus detection technology reduced the total cost of labour for a breeding season compared with visual oestrus detection aided by tail paint. However, Labour costs need to decrease considerably to

impact profitability of investing in automated oestrus detection technologies (Rutten et al. 2014). Although, some farms may find that with staff that are less trained in oestrus detection this technology investment may compensate for the otherwise loss reproduction performance or stress on a smaller number of individuals having to all the detection.

The actual return on investment and decision support tools, like Thomas et al. (2019) created for oestrus detection technologies, needs to be considered further for all these technology options so farmers can better understand their options and can justify their decisions easier. In many of these cases these technologies will have to create a saving in labour in order to offset the investment costs. Eastwood et al. (2022) raises a valid point that due to high turnover among employees in the NZ dairy sector, technologies must be easy to learn for new staff. That is, if the new technology hasn't resolved the original turnover problem anyways. Any new technologies will need to be incorporated in the holistic system design with the assistance of relevant stakeholders to ensure it will be effective among the other existing technologies in a farm system.

Another technology which has promise for supporting job satisfaction and labour requirements is robotics in the milking shed. Eastwood et al. (2022) indicates that robotics even just attaching cups to cows can still have benefits such as:

- Reduced injuries and physical demands on milking staff.
- Increased job flexibility.
- Ability for a wider range of people (e.g., age, height, strength) to be involved in milking.
- Creating an innovative image of dairy farming.

Eastwood et al. (2022) believes if robotics replaces the role of milking completely, there could be changes to the self-identity of farmers. These technologies, while novel, present a chance to adapt farm systems in such a way that helps improve job satisfaction and staff retention. However, more research is needed to support this hypothesis.

4.7.3 Reducing task difficulties

DairyNZ (2022b) found farmers suggested quick weekly team meetings to identify risk areas on-farm. For example, any holes or dips that could be a hazard for staff working at night during calving, or how to make calf pick-up easier and avoid heavy lifting.

Sprains and strains have been recognised to have major impacts on farm teams (DairyNZ, 2022b). These could be financial impacts or wellbeing impacts or both. According to DairyNZ (2022b), those who were injured took an average of 12 days off work and 27 days to fully recover. Some practises from farmers to mitigate any injuries occurring are listed by DairyNZ (2022b):

- "Have two staff pick up heavier calves together if needed
- use a specialised trailer to transport calves
- pipe milk into calf feeders instead of lifting buckets
- tuck hoses away after use in the milking shed
- invest in the right footwear - look for great grip and ankle support"

Some of these may be minor tweaks for some, but as discussed by other farmers and in the sector resources, these small adjustments could make a difference to staff satisfaction and retention with minimal effort required in some cases.

4.7.4 Farm scale and rosters

Larger farm teams may have more sense of community and belonging compared with smaller farms with only 1 to 3 people due to its share number of people being a community in itself. Smaller farm teams may have less flexibility to implement preferable and flexible rosters that suit different people. Thus, this may result in a farms scale influencing staff satisfaction and retention indirectly via the rosters able to be achieved in each farm system. However, Moss (2020) suggests that employee engagement goes in hand with job satisfaction and that it is not unique to any specific business type or size. Thus, there may still be adequate options on the smaller farm businesses if being flexible and open to changing certain processes on farm to allow for it.

An alternative approach to reduce total hours worked by an individual was suggested by Rangitikei dairy farmer Stu Taylor when interviewed by stuff reporter Galloway (2017). He suggests having more members within the farm team will give more overall job flexibility to the employees and a job share arrangement for parenting couples. This job-sharing structure may be an option for farms trying to allow flexibility with staff and their families as both parents may be able to share the workload on farm and with children while both getting to work and have family time each day. This may be more appealing to couples with young children, thus potentially improving job satisfaction and retention of these individuals.

4.8 Potential farm systems solutions in international dairy sectors

4.8.1 Canada

A Canadian farmer has recently implemented a new approach they call "mission focussed employment" (Moyer, 2022). This approach is attempting to make everything they do in their business and as a team sustainable so there is collective purpose and satisfaction with what is being achieved. "Integrating their sustainability message into their hiring and recruiting efforts" they state helps them recruit the "right" talent with similar values to their own (Moyer, 2022). They experience this improving their staff retention. This is like what is seen in some NZ farm businesses focusing on quality workplaces, however this may be more implicit than what this Canadian farmer is doing.

4.8.2 United States

Bewley et al. (2001) found that labour efficiency on US dairy farms increased with more cows per unit area farmed and fewer people involved in the milking process. Durst (2020) challenged this, suggesting that efficiencies can be gained at all herd sizes and increasing labour efficiency is not as simple as increasing cow numbers. There seems to be a consensus that Durst (2020) is correct, however, due to economies of scale there could be a certain scale reached where smaller scale farms may not be able to keep up with their level of efficiencies generated from share scale.

In the US, parallel milking parlours were associated with the highest cows per FTE followed by herringbone parlours, flat barns and then stall barns (Bewley et al., 2001), although no rotary cowsheds were included. Despite this exclusion, Bewley et al. (2001) does indicate the milking parlour type and quality of it can have an indirect impact on FTE requirements through number of cows able to be milked per FTE as well as directly via more time taken to complete other milking tasks.

These US based studies indicate milking shed type has an impact on labour efficiency. Regardless of the country, this is likely to be important. Muller & Schroder (2022) suggest wherever possible, metrics used by DairyNZ for sector monitoring should be assessed by various system factors to make benchmarks more relatable. Thus, retention metrics could be compared across different system types within the NZ dairy sector. The influence of milking shed on labour productivity is clearer than the flow on influence on staff satisfaction and retention.

4.8.3 Switzerland

LabourScope (Agroscope, 2022) is a Swiss based tool for calculating the time requirement of work and production processes on the farm. It allows a farmer to enter work plans and track how the team compare against the initially budgeted time and sector benchmarks across certain tasks. These are tasks such as moving and feeding cows. There are other tools used by other international sectors that the NZ dairy sector could learn from, however, these tools work off information that can be difficult to collect in NZ dairy farm systems, thus making it problematic for comparison. The use of technologies and improvements in data collection may help overcome this and allow for the NZ dairy sector to compare farm task efficiency in order to find opportunity to improve. These improved system efficiencies may then influence staff satisfaction and retention as suggested in section 4.5.

4.8.4 Ireland

Deming et al. (2017) found in the Irish dairy sector the most labour efficient farms used contractors to perform some tasks to substitute labour. Hogan et al. (2021) also found in the Irish dairy sector time-savings, measured as hours worked per cow, made on farms by implementing labour efficient work practices and technologies. These findings suggest that the Irish dairy sector are also interested in understanding what can be implemented in farm systems to either substitute labour or improve the quality of the workplace with various efficiency gains to improve staff satisfaction and retention. These findings all suggest this research on how farm systems influence staff retention on dairy farms is of relevance at a global scale.

4.9 Staff retention solutions in non-dairy sectors

The kiwifruit sector in New Zealand faces similar challenges to the dairy sector along with being a major competitor for labour. Scarlatti (2021) reported for the kiwifruit sector that an opportunity is in transitioning seasonal workers to permanent employment. Growers observed the improved staff retention and in turn sector retention from transitioning seasonal staff to permanent employees. However, the inconsistent labour requirement throughout the year still caused challenges for some growers. The idea of a 'shared permanent employee' came out of this and was seen as an opportunity to those that have requirements for a proportion of an FTE throughout the season to share staff members across orchards. This is similar situation to the dairy sector and thus may be an opportunity for the dairy sector to transition casuals into shared permanent employees to improve the retention of these individuals in the dairy sector.

Coates (2022) found that lifestyle, opportunities for learning, career progression, variety and open/transparent businesses are key drivers for those born 1995 and 2010 wanting to pursue a career in the red meat sector. Low pay, long hours, poor culture/management, and lack of career progression are the top reasons causing young people to leave jobs in the red meat sector.

The factors described by Coates (2022) are likely to have a significant influence on the job satisfaction and retention of a sectors workforce among different sectors. Although, there does seem to be a literature gap in other non-dairy sectors, just like the NZ dairy sector, regarding what features of the physical farm system or workplace environment may have influence on job satisfaction and retention, and particularly why these may have an influence and what solutions are there for farmers and other sector employers to make meaningful changes.

4.10 Summary

There needs to be more work done on both the dairy sector and other sectors to better understand what features of these farm systems may be influencing labour retention, why this may be the case and how changes can be made to resolve this. Any changes made to farm systems to help address

labour retention need to be considered in the broader farm system context and with consideration to all the relevant stakeholders, in line with Eastwood et al. (2022).

There is an abundance of literature suggesting what and how "soft skills" and human resources can be altered to improve job satisfaction and workplace retention, including the dairy sector. There was an array of resources found from this literature review that suggest how a farmer can improve in various aspects of their farm system, however, lacking connection to job satisfaction and retention of farm teams. The literature has singled out improvement to farm efficiencies rather than farm system changes in general to have an influence on job satisfaction and sequentially influence retention.

It was clear that there is an opportunity to compare job satisfaction and staff retention metrics across different system types and factors within the NZ dairy sector. This would help quantify some of the relationships alluded to in the literature and support the analysis for the research questions proposed in this project. This may also improve benchmarking ability of farms within the sector. Additionally, this would highlight where the sector may need to focus future research and where data needs to be considered.

A range of benefits and difficulties will exist for certain farm system changes but will differ on a farm-by-farm basis. Penno (2005) and Muller & Schroder (2022) specify that certain operators are already implementing the next steps for our industry to enhance workforce retention and job satisfaction. What's needed is finding more detail as to how these operators work within their farm systems to achieve their high level of retention. Therefore, interviews with those experiencing employment in farm systems first hand will improve the understanding and detail of the potential changes whilst also describing other potential changes yet to be discussed or found in the literature.

5 Thematic Analysis and Discussion

5.1 Theme findings overview

This section combines the literature review with the in-depth qualitative interview findings to identify and evaluate the common and contrasting themes. In most cases, the interview findings provide examples and/or context to the discussion and statements made in this section of the report.

In the context of this research, themes and sub themes are elements within the farm system that were found in this research's literature review and on farm interviews to influence staff satisfaction and retention. Common themes were consistent across the literature and multiple interviews. Contrasting themes are the divergent views between the literature and the interviews.

Although there is significant crossover within farm systems, the themes have been broken down into different areas of the farm system. These include livestock, feed system, infrastructure, machinery, natural landscape and scale, routines and rosters, communication and employer support and H & S and Leadership. Within these farm system areas, themes were broken down into further sub-themes via the data gathered. All themes were evaluated against the research question, namely their potential influence on job satisfaction and retention in the NZ dairy sector, and only the key themes are discussed in this section of the report.

5.2 Key elements of the farm system that influence staff retention

5.2.1 Livestock

The common and contrasting themes regarding Livestock are listed in Table 1.

Table 1: Livestock themes influencing retention

Main Theme in Farm System	Common Sub Themes Found	Contrasting Sub Themes Found
Mixed age cows	• Animal welfare and behaviour of people around cows. • Oestrus detection technologies. • More certainty of production and feed inputs. • Teat sealing to be left for the vets. • Technology used for accurate and streamlined recording. • Cow calving issues. • Animal euthanasia. • Dangerous methods to draft cows and automatic drafting. • Batt-latch gateway release timer.	• Organic treatments used for detected mastitis. • smaXtec system for simpler cow health management. • Culls kept to foster and rear calves. • Identifying health issues and treating cow methodology used. • MaxT implementation. • WhatsApp used as calving/mating "yellow notebook" substitute. • Run one singular herd vs splitting out heifers or light cows.
Calf rearing	• Quality and hygiene of facilities. • Role separate to farm manager.	• Feeding technique. • Distance from cow shed.
Replacements	• Seeing youngstock grown out well and healthy.	• Grazed on vs grazed off

Welfare and behaviour around animals

If not resolved in a timely manner, "an individual rough with animals can cause dissatisfaction to other team members and cause them to leave the farm, and in some cases the industry also" suggested a farmer interviewee. This was a common theme known to the farm consultant and the farmer interviewees. Thus, animal welfare and the way in which people interact with animals has an influence on employee job satisfaction and retention.

Mating the cows to bulls that won't cause difficult calving's, and particularly mating easy calving bulls to the first calving heifers, was evident to improve the job satisfaction of employees.

One farmer had fostered calves onto mastitis cows and slow milkers rather than culling them so instead they have reared nice beef calves. The farm manager said "I think that's awesome".

Herd health treatment method

Identifying health issues and the method used to treat cows were similar among all interviewed. However, one farmer suggested "when a cow is needing to be treated and you're not in the shed, it can be worrying. So, if an organic treatment works this will de-risk the wrong antibiotics being used." This could positively influence job satisfaction of employees by reducing the pressure and risks associated with antibiotics in the vat or using the wrong antibiotics. There were some employees interviewed that didn't enjoy treating cows, whilst others did enjoy this same task. This highlights how no system is going to be perfect for all stakeholders due to all people having different personal views and enjoyments within our existing and potential farm system designs.

Management support technology

Several interviewees said using oestrus detection technologies created job satisfaction as it makes their role easier or at least providing them with data to improve their certainty around decision making. Only one farmer owner operator and employee had implemented an animal health management tool ("smaXtec"), in their farm system. They saw smaXtec as a preventative measure rather than reactive approach to animal health as its use of temperature measurements picks up sick cows "2-3 days earlier than other new technologies." The benefits of smaXtec were made evident by this farmer and their herd manager, although this specific technology did not come up in the literature review of NZ used oestrus detection, rumination detection and calving activity alert technologies as they are "one of the first in NZ to get this system." This gave improved animal health, resulted in fewer cow deaths and in turn improved the satisfaction of the farmer and their staff. Thus, this implemented technology improving animal health and production may indirectly influence employee retention on NZ dairy farms via improved job satisfaction.

Several employees emphasised that manually drafting cows can be difficult and feel dangerous. Whereas employees on farms with automatic drafting technologies said their job satisfaction had improved compared with previous farms they had worked on. Thus, automatic drafting technologies are likely to have an influence on the retention of employees on NZ dairy farms.

Number of herds

Running one singular herd seemed more favourable by the interviewees. However, a simple system or the smaXtec and automatic drafting set up were what allowed this to happen compared with one farm running multiple milking herds. It was reinforced that, that running one herd made their management decisions easier and saved time on farm, thus improving job satisfaction.

Milking method

MaxT was also found to save time ("1 hour/day") when implemented by some of the farms. One employee suggested "you not feel awful for milking cows out, so MaxT improves animal welfare." This individual alone suggested it improves their job satisfaction implementing MaxT in their system, however, the other farms interviewed did not have MaxT implemented and did not comment on any influence from this on their job satisfaction. This suggests further investigation is required with a larger sample size of farmers to fully understand if implementing this process will positively influence employee job satisfaction and retention on NZ dairy farms.

Batt-latch gate release timer

The likes of a Batt-latch gate release timer (Figure 3) were used by two of the farms interviewed and one farmer described as an "easy and simple invention they wish they had earlier." This saves a job on farm and was described by another interviewee that they get satisfaction when going to milk having the cows already beside the milking shed on the feed pad eating happily. Thus, a simple technology such as the Batt-latch may be suggested by these farmers to improve job satisfaction and retention of employees in the NZ dairy sector.

Figure 3: Batt-latch automatic gateway release timer

Calf rearing

It was commonly found from interviewees that "having a separate person to the manager doing the calf rearing is ideal, so that 100% can be put into this job being done well." However, actual calf rearing technique differed between all farms. Techniques used included:

- Automatic calf feeders.
- Manually carting 20L buckets to calf feeders.
- Pumping from cowshed to a high trailer, then gravity feeding milk through a hose into the calf feeders when driving past.

Although there were different techniques used in order to feed calves, neither of these techniques were the reasons suggested by interviewees to cause dissatisfaction in their jobs. Poor facilities causing poor hygiene and sick calves, not having adequate time to put 100% into the job, bobbie calves and feeding twice a day rather than once were the examples given by interviewees that caused dissatisfaction in this job. This suggests that there may be calf rearing techniques and facilities able to be changed for some farmers to improve their staff satisfaction and retention.

Grazing replacements

All interviewees wanted to see their replacement youngstock grown out well. Several interviewees preferred having their youngstock around to look after them themselves whilst others preferred a grazer to take this job off their plate. Others had to use a grazer due to limited land area. An interviewee suggested "how well you can do them with the resources on hand is the main satisfying or not point." This indicates that the youngstock performance achieved has more influence on employee satisfaction and retention than the physical job itself.

5.2.2 Feed system

The common and contrasting themes regarding feed systems are listed in Table 2.

Table 2: Feeding themes influencing retention

Main Theme in Farm System	Common Sub Themes Found	Contrasting Sub Themes Found
Pasture management	• Setting up breaks a particular favourable task. • Technology use to enable simple and streamlined monitoring processes. • Paddocks same size to make daily break or paddock decisions simple. • An improved pasture measuring technology implemented. • Shared values of a simple predominantly pasture based system.	• Pasture measurement approaches. • Pasture walks shared between the team vs someone given the responsibility. • Understand why walks are done and pitfalls if done incorrectly. • Using "agCommander" app to allocate pasture and improve efficiency of setting up breaks. • 12-hour vs 24-hour breaks when on once a day milking.
Supplementary feeding	• Ability to feed out simply and safely. • Preference of fat well fed cows. • Receiving planned feed inputs. • "Simple systems" and "systems 2-4 have best retention". • Ease of measuring supplement with the infrastructure, technology and machinery on hand. • Feed out a day ahead. • Bales can be simpler for staff to understand than silage or mixed diets.	• Diet complexity. • smaXtec bolus rumination monitoring to aid diet adjustment decisions. • Developed their own app including the exact daily feed blend recipe for employees to match with the scales in the mixer wagon. • Having in-shed feeding working with silos rather than feeding out. • Having a feed pad next to the cowshed.

Paddock breaks

Setting up paddock breaks were found to be one of the most enjoyed tasks by interviewed employees. A potential reason could be employers are actively encouraging employees on setting up breaks as a pasture management learning experience rather than making it a monotonous task where they are not able to make decisions for themselves.

Shared values

Shared values of a simple pasture-based system between employer and employee improved the satisfaction of all parties on farm. This aligns with the Canadian farmers approach discussed in the literature review to improve employee retention.

Pasture measurement and support technologies

Different pasture cover monitoring approaches varied on different farm systems. These approaches included plate metering, eye assessment or using a tow behind C-Dax pasture meter. All, but one interviewee was forecasting feed ahead of time or using a feed wedge for grazing management decisions. From this research, it was less so the doing of the pasture walk that influenced job satisfaction of employees but more the understanding of why this job was being done and the pitfalls that can occur if not completed. Overall, those employees involved in how that data would be used were more likely to gain satisfaction from pasture management tasks. This research found that improved pasture measurement and management software's, and their availability to more farmers, are required as several farmers interviewed suggested this lacking technology.

Legal contract clarity

It was suggested by the farm consultant interviewee that contract milkers not getting the feed promised or not achieving the production expected of them causes higher turnover on a farm. Thus, there may be a need for some farmers to better outline their expectations of their contract milkers or sharemilkers prior to commencing into a legally binding agreement. If all aspects of the agreement are met and the certainty of feed input and production (subject to other factors) is there, this could have a significant influence on the retention of contract milkers and sharemilkers on NZ dairy farms.

Communicating and measuring diet requirements

A self-made app was created by an interviewee to better communicate to staff feed quantities to go in the mixer each day. The staff would simply just need to match the mixer scales with the quantities on their phone app. This was suggested by both employer and employee as a more streamlined communication method for timely herd diet adjustments.

The ease of measuring supplementary feed to formulate a diet was commonly discussed and although two employees didn't enjoy formulating a diet for cows due to "preferring simple pasture-based systems", other interviewees suggested that it's satisfying to have fat well fed cows. However, they also suggested that quality machinery and infrastructure is required otherwise a higher input system "can be more problematic and cause dissatisfaction from issues made." This related to what the farm consultant suggested when designing a farm system for their client, they find a system 3, based on the DairyNZ 5 feed systems (DairyNZ, 2021b), "the easiest to retain staff." They believe this is due to it being a simpler system with less potential issues that can arise from staff management.

5.2.3 Infrastructure

The common and contrasting themes regarding infrastructure are listed in Table 3Table 1.

Table 3: Infrastructure themes influencing retention

Main Theme in Farm System	Common Sub Themes Found	Contrasting Sub Themes Found
Milking shed	• Location and exposure to weather. • Reliability of equipment. • Time taken to milk. • Automatic drafting system. • "Rotary easier to work in than herring bone." • Automatic cup removers ("ACR's") and teat spraying. • Size of the shed, bale size, flow issues. • Milk meters measuring conductivity.	• Different shed types. • Robotic milking machines vs largely automated milking sheds. • Fit for purpose. • DelPro software. • Reminder alerts set per cow.
Effluent system	• Operate from phone. • Winter storage capacity. • "Don't like heavy gear." • Cleaning sand traps is a task the staff don't enjoy.	• Traveling irrigators vs pod irrigators. • Storage options (eg bladders, tanks or ponds) being most environmentally friendly.
Other infrastructure	• Calf shed quality and hygiene. • Poor fencing and power. • Dosatron installed. • Accommodation. • "Run down and messy farms cause dissatisfaction".	• Water leak identification and water level alerts.

Poor infrastructure impact

The consultant suggested two similar farms that were next to one another had the same farm owners and management structure, although "one had a nice rotary cowshed and the turnover of staff wasn't bad, while the other farm had an older herring bone shed which took longer to milk in and had a major challenge keeping people". The consultant highlighted that the most difficult farm to retain staff on they had experienced was drenching the cows each milking, contour and milking shed were difficult, it had large areas of temporary fencing, other infrastructure issues, long milking times and no Protrack or ACR's. Even those considered great operators with a good team of employees with them found the farm too difficult and these individuals also didn't last long on this specific farm. This example may be extreme compared to some dairy farm systems in New Zealand, although the reality is that many of these difficulties within this system can each be commonly found in other New Zealand dairy systems. Adding these difficulties together within a system is what seems to have the most significant influence on job satisfaction and retention.

Milking shed

The interviewee who milks in the DeLavel Delpro cowshed (Figure 4) said "I enjoy milking in this shed so much", keeps himself and staff safe from kicking cows, very automated and milking is very quick.

Figure 4: DeLaval Delpro designed cowshed at an interviewee's farm

The feedback received from the employers and employees of this modern DeLaval shed compared to the other farm's cow sheds seemed to have a significant influence on the job satisfaction of individuals. This comes at no surprise given the amount of time many farm workers have to spend in the cowshed day after day, although some clear enjoyment in the job was expressed by those working with the majorly automated cowshed facility compared with those interviewed working in the other cowsheds.

Milking shed efficiency

As discussed in the literature review, peak cows milked per FTE can be an effective way to measure efficiency within a dairy farm system and the dairy sector (Matheson et al. 2022). Even though some interviewees took 4 hours per milking compared to other interviewees who only took an hour and a half to milk in their shed, when calculating cows milked per hour, the 4 hour per milking farm actually milked approximately an extra 100 cows per hour than the majorly automated milking shed shown in

Figure 4. However, this is likely due to economies of scale with certain jobs like getting cows in and washing up fixed jobs in both sheds regardless of number of cows.

Once considering the actual labour time required the large 1,500 cow farm with the 60 aside herring bone shed with a drop-down rail rapid exit taking 4 hours per milking can milk 158 cows per labour hour spent in the milking procedure (including getting cows in, shutting in new paddock and wash up). This compares with the more automated rapid exit DeLaval shed that is allowing 178 cows to be milked per labour hour spent in the milking procedure, thus this system is more efficient for farm staff than the larger farms milking system.

The farmer with this four-year-old DeLaval cow shed explained the change from the previous shed. The number of labour hours saved per day was suggested to be 12 hours per day plus an improvement of data collection, simpler management of treating and drafting animals along with improved satisfaction in the milking job itself.

Calf rearing facility

Figure 5: Calf rearing facility at interviewee's farm

Many interviewees said they were fortunate with their calf rearing set-up (one shown in Figure 5) compared to the previous systems they had experienced. Some interviewees had described previous infrastructure they had to use for calf rearing and how poor the hygiene was due to the design of the shed and the distance of water and milk was from the calf sheds. This caused inefficiencies as it took extended time carting the milk to the calf pens. This also caused "cleaning the equipment very time consuming as it would all need to be transported back to the cowshed to clean it all". This same interviewee that made this comment believed their new system closer to the cowshed and with water next door created extra time in the day by having the calves fed and the gear washed in a much shorter

time frame. This was also more satisfying due to the calves being healthier than in the past calf rearing system. The design of the shed being warmer but higher to capture sunlight was suggested to be the reason by this interviewee.

Fencing

Inadequate electric fences can cause significant trouble with animals breaking out and causing extra work for farm team members. This can also cause safety and financial risks if cows get out on the public roads, along with additional discomfort for those responsible for the cows when going away for a break off farm.

Mineral dosing

Dosatron's were discussed by interviewees to simplify mineral dosing and improve animal health at key times of the year. Where a farm didn't have a Dosatron and the system had limited other avenues to supplement minerals into cows, the flow on effect of more down cows caused the contract milker and their staff dissatisfaction and a sense of lacking control over the system they managed. Thus, highlighting how a minor difficulty in this system may have flow on influences and indirect influences of staff satisfaction and retention.

Water leaks

"Water leaks on farm can be difficult and time consuming to find, although installing more taps on farm has made this a simpler job to identify where the leaks are". Also, Halo can alert when a water tank is low. Thus, small additions as these can reduce the dissatisfaction of farm team members.

5.2.4 Machinery

The common and contrasting themes regarding machinery are listed in Table 4.

Table 4: Machinery themes influencing retention

Main Theme in Farm System	Common Sub Themes Found	Contrasting Sub Themes Found
Machinery	• H & S of gear to complete tasks. • Reliable. "Old and dated causing frustrations." • Easy to maintain and drive. • Comfortable and warm on cold mornings or in poor weather.	• Driving of machinery • Electric bike liked due to being "light and safer." "Cows like it because it's quiet."

One interviewee described how their previous employer was continuously frustrated due to their farm owner being "old school who didn't want to spend a cent. A lot of gear was old and dated." The employer's continued frustration was the main reason one of the interviewees left their last job. This may suggest that it's not necessarily the machinery directly influencing the satisfaction and retention of staff, but the performance and problems associated with the machinery being used influencing an individual's job satisfaction. Although it was also found in this research that certain employees do not enjoy driving machinery "even a new tractor I wouldn't enjoy", whereas others find this the most enjoyable part of their farm roles. This suggests that machinery in each NZ dairy system may be a particular factor that's influence on job satisfaction and retention will depend on the individual employed.

5.2.5 Natural landscape and scale

The common and contrasting themes regarding natural landscapes and scale are listed in Table 5.

Table 5: Natural landscape and scale themes influencing retention

Main Theme in Farm System	Common Sub Themes Found	Contrasting Sub Themes Found
Location and climate	• Location of farm close to hobbies. • Weather not a concern. • Weedy farms requiring "capital spraying." • More than 45 paddocks per herd can be too many.	• Drought or flooding susceptibility. • Have completing weeds on farm a reward if realistic targets are met. • "Struggled with the wet soil type" due to cow pugging. • Right size paddocks in right place.
Contour/topography	• "Difficult putting up fences." • Unsafe machinery on hills to feed out with. • Harder on the body.	• Enjoyed the scenery. • Enjoyed the challenge the hilly contour provided.
General size of farm and herd	• Layout of the paddocks, cow races and cow shed. • "Small farms need to have a person with a large range of abilities."	• Larger herds require more planning to ensure things work. • Large scale can cause more "factory type jobs" on a farm

Climatic uncertainty

Regarding natural landscape and scale of a farm system, these have caused minor difficulties and dissatisfaction to some of the interviewees in this research, however, majority of these difficulties have minimal solutions or require a large amount of capital investment in order to change. One farm can get extremely dry in summer and irrigation may not be adequate causing unpredictable milk production. This uncertainty for the sharemilker interviewed was suggested to cause a level of distress and influence their satisfaction and retention within a farm business.

Healthy competition within farm team

Although most interviewees agreed that weedy farms requiring a lot of spraying was dissatisfying, one farmer implemented a reward for the individual in their team that best showed commitment to meeting the business weed spraying targets. This found healthy competition between employees causing improved productivity of all and improved satisfaction of the "senior team members" due the work being done. This may suggest that healthy competition in the workplace between employees can drive their productivity and hopefully flow on to improve the satisfaction of the whole team.

Scale

Scale of the farm and the number of employees didn't seem to affect the ability to have flexible rosters and a five and two days off competitive roster as originally believed when conducting the literature review prior to the interviews.

5.2.6 Routines and rosters

The common and contrasting themes regarding routines and rosters are listed in Table 6.

Table 6: Routine and roster themes influencing retention

Main Theme in Farm System	Common Sub Themes Found	Contrasting Sub Themes Found
Milking routine	• Automated. • Simplicity to draft cows and identify cows to not be in the vat. • Long hours in the shed. • Milking frequency. • Efficiency of the shed.	• Delpro system. • MaxT implementation. • Winter milking.
Work roster	• Flexible rosters to suit individuals' personal lives. • Adequate breaks. • Lack of diversity or only doing "monotonous jobs."	• 5 on 2 off roster vs 8 on 2 off roster vs 12 on 2 off roster.

Role diversity

Moore et al. (2020) found that employees who identified their role as milking intended to have a faster turnover. This suggests that this specific task and/or the lack of diversity in this role, as milking can be the only task some employees perform on farms, may be a significant influence within the farm system of staff turnover. Although all interviewed did not align with this statement by Moore et al. (2020), it does not mean this is not an occurring issue on NZ dairy farms influencing the job satisfaction and retention of individuals in the sector. Further investigation will need to be done interviewing a larger sample size of farmers in order to confirm this is an issue in the NZ dairy sector influencing staff satisfaction and retention.

Improved efficiencies

This research found anything that improved the efficiencies within the milking routine generally brought both the employees and employers increased satisfaction in their jobs. Therefore, any of the solutions listed in Table 6 may be an opportunity for NZ farmers to improve employee job satisfaction and retention if these provide efficiency gains in the milking process.

Winter milking

Winter milking was discussed by an interviewee as a potential difficulty when attracting staff. This may suggest the idea of winter milking causing dissatisfaction or awareness of potential dissatisfaction in their jobs to potential employees if they were to work there.

Roster

One employee had previously worked three weeks on two days off roster and now is on five days on two days off roster and thinks it's the "best roster ever." Two of the four farms had five days on two days off rosters, while one other had an eight on two off roster and the other a twelve on two off roster. With all these different roster options, there were no negative or constructive comments made to any of these as all employees seemed to like their existing rosters. This suggests that everyone may prefer a different roster depending on the person or due to other aspects of the farm system functioning well, the roster system had a less significant influence on their job satisfaction and retention.

5.2.7 Communication and employer support

The common and contrasting themes regarding communication and employer support are listed in Table 7.

Table 7: Communication and employer support themes influencing retention

Main Theme in Farm System	Common Sub Themes Found	Contrasting Sub Themes Found
On farm employer support	• Appreciation of good work done. • Collaborative group decision making. • Provides a degree of autonomy. • Provide meals to all staff during calving. • RPs off farm to support staff decision making. • Organisation to be there when needed.	• Owner won't invest in certain "viable upgrades". • Lawn mower provided to incentivise staff cleanliness and pride in the work. • Dairy industry version of "Growing future farmers" initiative.
Plans/ communication platforms	• All farms (apart from one) used social media or apps to communicate and record. • Provide knowledge and learnings to tasks. Explaining the 'why'. • Plan ahead to create efficiency. • Allow time for things to go wrong. • Team communication.	• Poor cell phone reception. • Regular team meetings. • Internal farm discussion group. • Project Management tools e.g., Trello and google docs.

Training

An initiative similar to the NZ sheep and beef sectors "growing future farmers" may also be an opportunity for dairy farmers to utilise small amounts of labour when needed but also give young people in NZ a chance to experience the sector and its opportunities and enjoyments it can provide.

Understanding the purpose

A common theme developed from these interviews and only in brief terms in literature or industry knowledge is the importance of the employees to understand the "why". This could also be understood as employees having tasks and decision making completely explained by someone, so they understand the purpose, the benefits if done well and the implications if not done correctly. This expanded to find that most employees were interested in the decision-making process of others in their teams particularly the owner or employer in order to better understand the purpose of all operations. Diving deeper, it is believed the interviewees interest sparks from wanting to better understand how their own position matters, how their role and tasks they complete tie into it and for share learning so they can grow as individuals and perhaps progress in their careers with the gained knowledge.

Appreciation of work done

A common theme among employees interviewed was the fact that they would like more appreciation from their employer for the good work they do. DairyNZ (2022a) also found this when speaking with the 2022 Primary Industries Good Employer Awards winning Southland dairy farming couple. Porter (1993) also found this when interviewing 30 dairy employees in the UK. Given the amount that this

feedback from employees came up, this could make reasonable differences with farm teams for very little to no cost and time input from an employer, making this seem like an attractive focus for some.

Project management tool

One interviewee uses a free project management platform "which allows our team to see and manage farm tasks. This gives us the flexibility to better manage workloads to avoid too much overtime." This is "scalable, free and can be broken down or colour coded per aspect of the farm system if desired." This also includes a "farm system ideas note" to give staff the chance to provide any ideas they may have. It will cover H & S hazards etc and information for contractors. The tool interface can be seen in Figure 6.

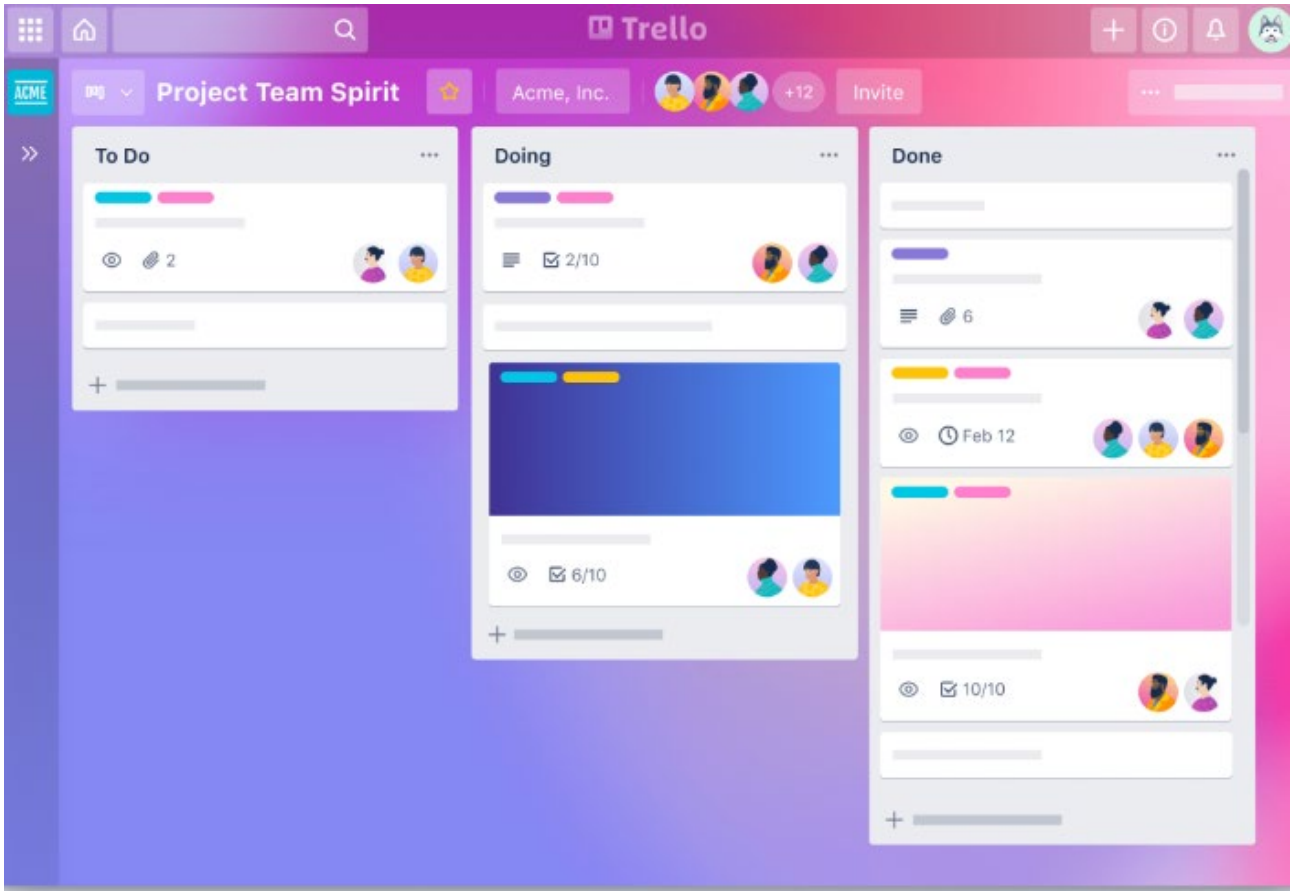

Figure 6: Visual workflow and task tracking tool Trello (Trello, 2022)

5.2.8 H & S and Leadership

H & S and leadership/community found themes are listed in Table 8.

Table 8: H & S and leadership/community themes influencing retention

Main Theme in Farm System	Common Sub Themes Found	Contrasting Sub Themes Found
H & S	• Unsafe tasks such as feeding out on slippery hills, being in a yard with Jersey bulls or drafting animals manually. • Healthy home standards met. • Adequate time off and relief labour. • Unsafe machinery.	• Breast rail on hydraulics to stop cows kicking while milking. • Floor mats in cowshed entrance. • "Can be dangerous getting cows back on to the race with one person when crossing the road."
Leadership/ community	• Anthropocentric behaviour of employers and people managers. • A sense of community on farm and surrounding off farm. • Isolation. • All sharing the monotonous jobs. • Invest in staff training and career progression. • Appreciate and show employees are valued. • Give credit to all those involved.	• Style and interaction working with one or two employees vs seven employees. • Do it all together if the job is overdue and not being done. • Control over the farm system. • "you've made it when you make yourself redundant" due to Training the team adequately. • Discuss succession. • Match roles with individuals' skillsets.

Team size and leadership style

Although all employers and people managers interviewed showed innovative thinking to their role and were anthropocentric when operating with team members, there were noticeable differences to their interactions and leadership styles between the large-scale farm and the small-scale farms. Further research with greater sample sizes may be able to uncover if there is a true connection here between team size and leadership style on farms as noticed from the small number of interviews conducted.

Shared values

The values aligning between employer and employee were observed in the interviews and discussed to find that this brought satisfaction to both parties. The values in this case were essentially "keep something simple to get the most out of it." This is in line with Moyer (2022) and the Canadian farms "mission-based employment" to ensure their values as employers are aligned with those they recruit as employees. The Canadian farmer suggested this improved their employee retention (Moyer, 2022) although very little is spoken of this in NZ dairy literature suggesting an influence on improved employee satisfaction and retention. Thus, this may be underrated as a solution to improve retention for farmers recruiting farm workers in NZ.

5.3 Retention levels further discussed

5.3.1 System adaptability

One interviewee recently experienced a manager leaving due to not handling the pressures of the type of system they were attempting to put in place. This system also saw the other staff on this farm dissatisfied and overworked. The farm owner changed the system immediately after this manager was

gone in order to make all farm aspects simpler for the remaining staff and themselves to run the farm until a new manager was recruited. These remaining staff members were interviewed and were found to have really changed in regard to their job satisfaction since these system adjustments had been made. These changes to the system included, but were not limited to, 24-hour breaks, once a day milking, combining herds, simpler milking procedures and allocation of tasks. This does highlight how a system can be altered at short notice to improve the satisfaction and in turn improve the retention of individuals in the NZ workforce.

5.3.2 Individual workload

There is an importance for employers to realise the workload of their employees and themselves required from the policies they choose to implement. It is important to consider a time buffer to allow for the extra capacity required to solve any issues that arise so that when an issue occurs, this doesn't cause long hours for any individual employee. This structure will provide the time and thought capacity to go above and beyond expected tasks to improve the farm or improve personal work/life balance. This way employees can come to work engaged and happier to influence better decision making on a daily basis. These points are emphasized more at the peak workload part of the season (calving time on most NZ dairy farms) as this short period of the season can be the singular negative influence on labour retention.

5.3.3 Explaining the why

A farmer interviewee suggested that many "corporates have broken down roles on a farm", "lack the daily personal factor/connection with staff" and limit diversity in some of these roles causing "factory type jobs." This limits staff purpose and their understanding of why system decisions are being made and why certain tasks are done. This then can reduce the context and drive of the whole team to complete all farm tasks as they can lose a sense of importance in the workplace. This can then cause them to lose satisfaction in their jobs and cause higher turnover.

5.3.4 System design

A farmer interviewee described their system as "doing the basics right" which aligned with their employees' descriptions and enjoyment of this simple system. This farmer also commented that they fear their workplace attractiveness "could get left behind by not getting involved" with some new technologies that other farmers are implementing. This may suggest that some farmers are feeling as if they need to implement more technologies in their farm systems in order to attract, recruit and retain passionate and talented employees in their farm teams.

5.3.5 Position design specific to the individual

It was also clear that each employee had a different set of skills and passions for different parts of a farm system. These specific strengths and passions of an individual should be considered at the initial stages of recruitment to ensure the person being employed will benefit and work well within the existing farm team and system. This will be advantageous to the employer as this individual can be provided certain responsibilities that they are most likely to thrive in and enjoy. The employee will also benefit as they potentially will not have to be heavily involved in the certain tasks that they may themselves have difficulty with or get dissatisfaction in doing.

The ideal role was found to be different per individual in this research and means employers need to take time early on in an individual's employment, or preferably earlier when recruiting, to better understand them and what they are best to offer to a farm business. However, there were common strengths and passions among different individuals. These commonalities tended to be either an

animal orientated passion, a machinery orientated passion or a people orientated passion. Even though majority of individuals will have a passion for a number of these things almost all interviewees were able to be situated into one of these three overarching key passions. Understanding individuals in this manner may help making decisions regarding what types of work and/or responsibilities are delegated to each member of a farm team. This may improve the job satisfaction of individuals and then improve the retention of these passionate and talented people in the NZ dairy sector.

5.4 Summary

This research found that various difficulties within a farm system build on one another having more of a multiplied influence on job satisfaction rather than summative. This was reinforced by the farm consultant interviewed suggesting the combination of daily cow drenching required, hilly contour and a difficult cowshed caused the highest turnover of any farms in their experience.

The findings from the interviews suggested the odd minor difficulty on farms "weren't going to make or break" someone staying. However, resolving or eliminating a difficulty within the system found by an employee may me a simple and practical step to implement to improve the job satisfaction of employees and possibly the employer in the same action. This one or few small system adjustments resolving or eliminating some of the difficulties of members in the farm team may seem minor, but may be a step forward in improving staff retention. It is important to note that this one or few small adjustments that could be made to improve the farm team job satisfaction and retention will be different depending on the farm system and its existing team members. Therefore, understanding the difficulties for each staff member within the specific system could prove to be of use when making decisions on the farm system in general, but particularly when attempting to find solutions to improve staff job satisfaction and retention.

The potential financial costs these "difficulties" may have on a farm business compared to the cost of implementing a solution to the "difficulty" should be considered. There is an opportunity for future work investigating the cost benefit analysis for solutions of "difficulties" found by interviewees in this research. There may also be more solutions and difficulties worth investigating that may come out of further in-depth assessments of farm systems and the teams that operate within them.

Since the employers interviewed were considered as top performers of the NZ dairy sector for their staff retention, it will be useful comparing their systems and retention levels in further detail to others in the sector. This will highlight the differences and truly understand the cost benefit analysis of these overall implemented systems.

There was a significant crossover of solutions found from various interviewees within the same roles or even in different positions. These have been arranged in Figure 7. to best illustrate where the solutions were raised and the cross over between interviewees. The employers include the farm consultant, owner operators and the sharemilker while all other interviewees were classed as employees. Figure 7 also highlights the most important solutions found within this research.

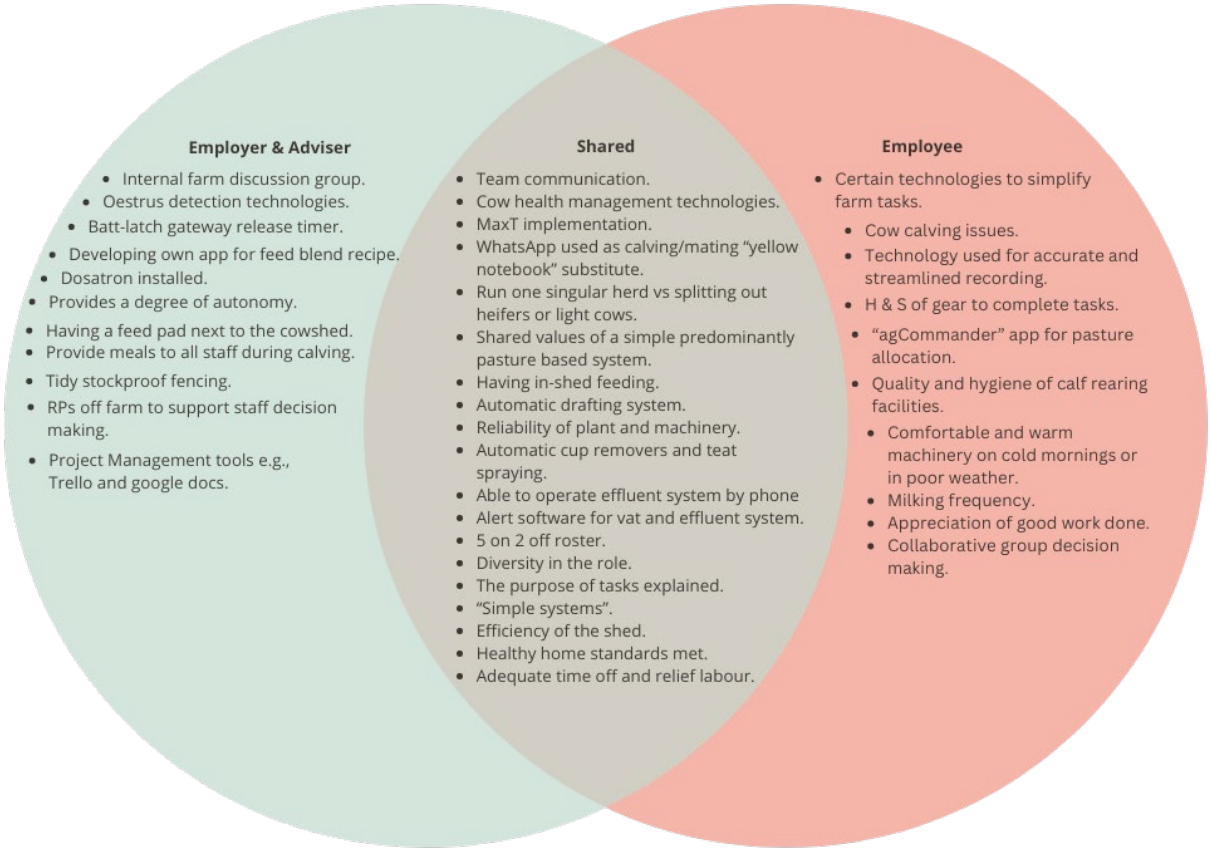

Figure 7: Summary of key farm system solutions that influence employee retention

Some of these solutions in Figure 7 may not be new for the sector, but the practises or technologies listed are recognised as they were noticeably having an influence on the satisfaction of the interviewees' employees. It is these practises or technologies, among the important HR and soft skills recognised, that need to be better understood in order to improve the retention of the NZ dairy workforce.

It was noticed that from the interviews, adequate training may provide employees the autonomy to come up with any solutions themselves for any additional difficulties they find in their farm system. Future research should capture these difficulties and solutions in order to aid these being actioned in the sector.

There are many challenges currently facing the NZ dairy sector, so it as important as ever for farm business owners to focus and prioritise their energies where most necessary. There are opportunities for any further dairy workforce research to be integrated with the likes of He Waka Eke Noa, Dairy Tomorrow, Sustainable Dairying: Water Accord, and Fit for a Better World to help focus the energies of farmers.

In any further workplace and labour retention research, it is important to consider as suggested by the consultant interviewed in this research:

"Sometimes it's the people they work with and sometimes it's the farm itself"

6 Conclusions

With the unsustainably high turnover rates along with the lack of progress in labour efficiency gains as a NZ dairy sector, there is significant importance to better understand how job satisfaction and retention of employees in the sector can be improved. While there is an abundance of literature on the soft skills and HR tweaks that a farmer can make to improve retention, this research intended to explore the literature gap of how various aspects of a farm system also influence retention of people in the NZ dairy sector.

This research found that a large number of various difficulties within a farm system build on one another having more of a multiplied, rather than summative, influence on job satisfaction and retention of NZ dairy farm employees. Therefore, understanding the difficulties for each staff member within the system could prove to be of use when making decisions on the farm system in general, but particularly when attempting to find solutions to improve staff job satisfaction and retention. It was found that implemented farm practices and gained farm efficiencies can influence job satisfaction and sequentially influence retention.

Understanding an individual's strengths and passions before employing, or at the early stage of employment, will guide specific responsibilities best to provide this individual to improve their job satisfaction and chance of staying within the farm team.

Explaining the "why" or the purpose of all aspects of the farm system and policies implemented on farm to employees was particularly consistent throughout the interviews and literature to improve employee job satisfaction and retention. This reinforces the importance of induction/orientation and continuous support at the beginning of an employment term.

It has been found that actual tasks required to be completed are not necessarily what influences an employee's job satisfaction and retention. There may be more effective improvements in job satisfaction and retention on NZ dairy farms if focusing on the internal task efficiencies, performance factors related to these tasks and ensuring the purpose of tasks are well understood by employees to then be able to include them in successive decision making.

Employers who see the benefit in looking deeper into their own behaviour and environment they provide on farm, or those interested in challenging the status quo, will be the ones to gain most from this research.

Any change in a farm system prompted by this research, completing and understanding the total investment return and cash flow implications for the specific farm will be crucial. Further independent case studies should be done to better understand the investment return on the various technologies discussed and not discussed (due to project scope) in this research. There is an opportunity for more farmer decision-support tools to be created to evaluate the economics of adopting new technologies on farms and allow for comparison with other technologies.

There is potential to further understand the difference of characteristics or aspects associated with a leader of a small business vs a large business as this potential difference was highlighted in this research.

Further work is required in comparing the themes and conclusions from this research with a greater sample size of NZ dairy farmers, their employees and rural professionals that support the design of

farm systems. This will ensure these conclusions made are not generalized and will still work for other farms different to those in this specific research. It is important to recognise that some of the solutions suggested in this research may not be practical or transferable to all NZ farm systems due to the differing nature of farmland and those occupying the land.

It will be useful for future research to compare the systems and retention levels in further detail of these recognised top performers in the NZ dairy sector with others in the sector. This will highlight the differences and aid the understanding of the cost benefit analysis of these implemented aspects of the farm systems.

7 Recommendations – Call to Action

7.1 For Farmers:

Consider examining each part of your specific farm system with all team members separately to gain understanding of the potential difficulties they may be facing.

Investigate job preferences of your farm team members and specifically any solutions they may have to the difficulties found within the system.

Examine each individual's strengths and passions before employing to guide their most suitable responsibilities and improve their job satisfaction and retention in your farm team.

Commit to explaining the purpose (the "why") of all aspects of the farm system and policies implemented on farm to employees to improve their engagement and satisfaction in the business and improve the chance of retaining them in your business.

Complete and understand your specific farm's total investment return and cash flow implications of any proposed change in your farm system.

7.2 For the NZ Dairy Sector:

Showcase the "top performing farmers" as case studies online to inform the rest of the sector what system adjustments have helped, how they have been implemented and how they are continuously managed to improve staff satisfaction and retention.

Commit to investigating more independent farm case studies to uncover further solutions and connections between farm systems and employee retention.

Investigate the investment return and other benefits of various technologies discussed in this research along with other technologies or procedures available.

Develop further farmer decision-support tools to be created to evaluate the economics of adopting new technologies on farms and allow for comparison with other technologies.

References

Agroscope. (2022, September 10). *LabourScope: The work budget for agricultural and domestic activities.* https://www.agroscope.admin.ch/agroscope/en/home/topics/economics-technology/labour-sciences/labourscope.html

Beca, D. (2021). Labour cost and labour efficiency within the Australian dairy industry. *Australasian Agribusiness Perspectives, 24*(18) 258-281.

Bewley, J., Palmer, R. W., & Jackson-Smith, D. B. (2001). Modeling milk production and labor efficiency in modernized Wisconsin dairy herds. *Journal of Dairy Science, 84*, 705-716. https://doi.org/10.3168/jds.s0022-0302(01)74525-0

Bhasin, H. (2019). *What is employee turnover? Desirable and undesirable turnover.* Marketing91. https://www.marketing91.com/what-is-employee-turnover/

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Chartered Institute of Personnel and Development ("CIPD"). (2021). *Employee turnover and retention.* https://www.cipd.co.uk/knowledge/strategy/resourcing/turnover-retention-factsheet

Coates, I. (2022). *Retaining rangatahi in the red meat sector*. Rural Leaders. Retaining-Rangatahi-in-the-Red-Meat-Sector-Isabelle-Coates.pdf (ruralleaders.co.nz)

DairyNZ. (2019). *Spring Survival Guide: Top tips and tools for getting through spring*. https://www.dairynz.co.nz/media/5791642/spring-survival-guide-2019.pdf

DairyNZ. (2021a). *Economic survey 2020-21*. https://www.dairynz.co.nz/media/5795678/economic_survey_2020-21_a4_booklet_web.pdf

DairyNZ. (2021b). *New Zealand dairy statistics 2020/2021*. https://www.dairynz.co.nz/media/5794941/nz-dairy-statistics-2020-21-web.pdf

DairyNZ. (2022a, September 10). *Making farm staff feel appreciated every day*. https://www.dairynz.co.nz/news/making-farm-staff-feel-appreciated-every-day/

DairyNZ. (2022b, September 10). *Setting your team up for calving success.* https://www.dairynz.co.nz/animal/calves/setting-up-for-calving/setting-your-team-up-for-calving-success/

DairyNZ. (2022c, September 10). *Managing staff shortages.* https://www.dairynz.co.nz/people/recruitment/recruit-and-select/managing-staff-shortages/

DairyNZ. (2022d, September 10). *Cost calculator*. https://www.dairynz.co.nz/people/recruitment/employee-turnover-cost-calculator/

DairyNZ. (2022e). *Great futures in dairying: Our plan for a resilient workforce 2022–2032*. https://www.dairynz.co.nz/media/5795487/dnz_great_futures_in_dairying_a4-booklet_web_june2022.pdf

DairyNZ & Federated Farmers. (n.d.). *Sustainable dairying: Workplace action plan.* DairyNZ. https://www.dairynz.co.nz/media/2841148/sustainable-dairying-workplace-action-plan-WEB.PDF

Deming, J., Gleeson, D., & O'Brien, B. (2017). *Labour efficiency on dairy farms.* Animal & Grassland Research and Innovation Centre. https://www.teagasc.ie/media/website/publications/2020/Labour-Efficiency-on-Dairy-Farms--Irish-Dairying-Moorepark-17.pdf

Durst, P. (2020). *Dairy farm labor efficiency*. Michigan State University Extension. https://www.canr.msu.edu/news/dairy-farm-labor-efficiency

Eastwood, C. R., Dela Rue, B., Edwards, J. P., & Jago, J. (2022). Responsible robotics design: A systems approach to developing design guides for robotics in pasture-grazed dairy farming. *Front. Robot. AI, 9*. https://doi.org/10.3389%2Ffrobt.2022.914850

Eastwood, C. R., Greer, J., Schmidt, D., Muir, J., & Sargeant, K. (2018a). Identifying current challenges and research priorities to guide the design of more attractive dairy-farm workplaces in New Zealand. *Animal Production Science, 60*(1), 84-88. https://doi.org/10.1071/AN18568

Eastwood, C. R., Greer, J., Schmidt, D., Muir, J., & Sargeant, K. (2018b). *New dairy workplace design: The challenge of attracting and retaining staff to the NZ dairy farm of 2030*. HAL archives. https://hal.archives-ouvertes.fr/hal-01961396/file/Hostiou%202018%20cork_1#page=71

Eastwood, C. R., Jago, R. J. G., Edwards, J. P., & Burke, J. K. (2016). Getting the most out of advanced farm management technologies: roles of technology suppliers and dairy industry organisations in supporting precision dairy farmers. *Animal Production Science, 56*(10), 1752-1760. http://dx.doi.org/10.1071/AN141015

Federated Farmers & Rabobank. (2022). *Farming salaries 2021/22: Remuneration summary report.* Federated Farmers. https://www.fedfarm.org.nz/FFPublic/FFPublic/Support/RemReport/Farming_Salaries_Report.aspx?WebsiteKey=00ff782d-8ff5-4a81-ae69-785972132c32

Figure NZ. (2022). *Worker turnover rate in the dairy cattle farming industry in New Zealand.* figure.nz. https://figure.nz/chart/UnU1ikzBns1yijnY-VRFwx1bI0yNXCuA0

Galloway, J. (2017, June 30). Rangitikei dairy farmer Stu Taylor changes the way he employs dairy farm staff. *Stuff*. https://www.stuff.co.nz/business/farming/dairy/94205660/rangitikei-dairy-farmer-stu-taylor-changes-the-way-he-employs-dairy-farm-staff

Gargiulo, J. I., Eastwood, C. R., Garcia, S. C., & Lyons, N. A. (2018). Dairy farmers with larger herd sizes adopt more precision dairy technologies. *Journal of Dairy Science, 101*, 5466-5473. https://doi.org/10.3168/jds.2017-13324

Hogan, C., Kinsella, J., O'Brien, B., Markey, A., & Beecher, M. (2021). Estimating the effect of different work practices and technologies on labor efficiency within pasture-based dairy systems: *Journal of Dairy Science, 105*(6), 5109-5123. https://doi.org/10.3168/jds.2021-21216

Lamm, F., Massey, C., & Perry, M. (2007). *Is there a link between workplace health and safety and firm performance and productivity?* https://www.researchgate.net/publication/228626681

Matheson, L., Schroder, B., Brazendale, R., Dooley, A. E., MacCormick, A., & Inness, M. (2022). *Competitive Insights: NZ dairy and US dairy sectors.* A report prepared for DairyNZ Ltd.

Miller, B. (2021). *What is the true cost of transience to the New Zealand dairy industry?* Rural Leaders. https://ruralleaders.co.nz/wp-content/uploads/2021/04/Miller-Brent_The-true-cost-of-transience.pdf

Moore, S. J., Durst, P. T., Ritter, C., Nobrega, D., & Barkema, H. W. (2020). Effects of employer management on employee recruitment, satisfaction, engagement, and retention on large US dairy farms. *Journal of Dairy Science, 103*(9), 8482-8493. https://doi.org/10.3168/jds.2019-18025

Moss, L. (2020). *Employee engagement: The key to retaining talent and passion on New Zealand dairy farms.* Rural Leaders. https://ruralleaders.co.nz/wp-content/uploads/2020/12/Moss-Lucy_Kellogg-report-final.pdf

Moyer, J. (2022, July 18). Sustainable HR. *Country Guide.* https://www.country-guide.ca/guide-business/sustainable-hr/?utm_source=GFM+Publications&utm_campaign=f276221d55-Country+Guide+daily+enews+west+Jul+19%2C+2022&utm_medium=email&utm_term=0_2da8244677-f276221d55-88838205&mc_cid=f276221d55&mc_eid=2380f6f097

Muller, C., & Schroder, B. (2022). *Dairy farm workforce productivity metrics.* A report prepared for DairyNZ Ltd.

Nelson, N. (2021, January 7). *Identifying ad addressing employee turnover issues.* Wolters Kluwer. https://www.wolterskluwer.com/en/expert-insights/identifying-and-addressing-employee-turnover-issues

Penno, J. (2005). *People Productivity*. Synlait, New Zealand.

Porter, J. C. (1993). What employees think about their jobs. *Journal of Dairy Science, 76*(9), 2065-2068. https://doi.org/10.3168/jds.S0022-0302(93)77541-4

Riedel, J. E., Lynch, W., Baase, C., Hymel, P. & Peterson, K. W. (2001). The effect of disease prevention and health promotion on workplace productivity: A literature review. *American Journal of Health Promotion, 15*, 167-191. https://doi.org/10.4278/0890-1171-15.3.167

Rolfe, C. (2017). *Leadership and employee engagement in the New Zealand dairy farming industry: Is there a link with milk production performance?* [Masters Thesis, Massey University]. https://mro.massey.ac.nz/xmlui/handle/10179/11493

Rutten, C. J., Steeneveld, W., Inchaisri, C., & Hogeveen, H. (2014). An ex ante analysis on the use of activity meters for automated estrus detection: To invest or not to invest? *Journal of Dairy Science 97,* 6869–6887. https://doi.org/10.3168/jds.2014-7948

Scarlatti. (2021). *Understanding the kiwifruit workforce size, composition and projected growth: Findings report for discussion.* New Zealand Kiwifruit Growers Incorporated.

Seglias Winship limited. (2008). *Dairy farm labour productivity.* Scoping report prepared for DairyNZ and the Department of Labour.

Thomas, E. B., Dolecheck, K. A., Mark, T. B., Eastwood, C. R., Dela Rue, B. T., & Bewley, J. M. (2019). A decision-support tool for investment analysis of automated oestrus detection technologies in a seasonal dairy production system. *Animal Production Science 59*, 2280-2287. https://doi.org/10.1071/AN17730

Trello. (2022, September 10). *Trello*. https://trello.com/en.

Appendices

Appendix 1: Interview questionnaire guide

Employer:

1) A) Tell me a little about yourself?
   B) How you got to where you are today?
2) Please explain your farm system to me? (follow up to get data for cow#, staff#, farm size, cowshed type and size, #paddocks, feed system and methods, machinery used, infrastructure, installed technologies, calf rearing and youngstock grazing, wintering/dry period methods, fertiliser, calving and mating procedures, fencing, water system, effluent, irrigation, compliance, financial, animal welfare, environmental or cultural values, location/isolation/climate, milking frequency, rosters, HR and H&S)
3) A) How would you describe your farms staff retention?
   B) How long has each staff member stayed on and not stayed on?
   C) What made the difference between these staff members staying vs not?
   D) What do you consider "healthy" levels of retention on your farm? (eg #years, amount of experience or capability per role available on your farm)
   E) How do you believe this compares to the rest of the dairy sector?
4) Thoughts on the number of people leaving vs coming into the dairy sector? (Perspective or unsure?)
5) How does … (fill in with specific parts of the system highlighted so far, but touch on topics listed above) impact staff satisfaction and retention on your farm? (eg implementation of certain technologies or processes unlike other systems)
6) What do you believe has been the most successful thing you implemented or have done in order to have a better staff retention and/or job satisfaction?
7) A) From your experience what systems or farms seem to retain staff better than others?
   B) What do they do differently?

Employee:

1) A) Tell me a little about yourself?
   B) How you got to where you are today?
2) Please explain the farm system here that you work in? (see if it matches the owners to observe how clear cut the system actually is and how well communicated it is with staff).
3) What is your role on this farm?
4) What tasks, or parts of the system are you responsible for or mainly work in?
5) What key reasons are retaining you in this position or within this farm team?
6) A) Are there parts of the current farm system that you don't like doing?
   B) Do you think about how it could be improved/changed so that you have more satisfaction in that task and your overall job? (Prompt aspects of the system as listed above and previously discussed).
7) A) Is there room for you to step up within this farm system?
   B) Does this motivate you in your work on a daily basis? Or Does this effect your daily motivation?
   C) Does this influence your likeliness to stay with this specific dairy business?

Farm Consultant:

1) How long have you been advising farm clients on HR and farm systems?
2) From your experiences, what made the difference between staff members staying vs not?
3) What do you consider "healthy" levels of retention on your clients farms? (eg #years, amount of experience or capability per role available on a farm)
4) How have you experienced staff retention in the dairy sector?
5) Thoughts on the number of people leaving vs coming into the dairy sector? (Perspective or unsure?)
6) What do you believe has been the most successful thing you implemented or have done with a client in order to have a better staff retention and/or job satisfaction?
7) A) From your experience what systems or farms seem to retain staff better than others?
   B) What do they do differently?
8) Please step out your process you take in order to design a new farm system for a client (from scratch eg conversion, then established eg purchased)?
9) Your client's priority is to mitigate staff issues as much as possible and have optimal job satisfaction and retention of all parties on their large-scale dairy farm. With staff job satisfaction and retention at the fore front of this system design how would you address the following parts of the farm system? cow#, staff#, farm size, cowshed type and size, #paddocks, feed system and methods, monitoring and data collection, machinery used, infrastructure, installed technologies, calf rearing and youngstock grazing, wintering/dry period methods, fertiliser, calving and mating procedures, fencing, water system, effluent, irrigation, compliance, financial, animal welfare, environmental or cultural values, location/isolation/climate, milking frequency, rosters, HR and H&S.

Appendix 2: Topic Question Tree