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RURAL LEADERSHIP
PROGRAMME

The AI Shift:

Redefining Skills and Leadership for Rural Professionals in New Zealand's Primary Sector

Kellogg Rural Leadership Programme

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Executive Summary

The increasing use of artificial intelligence (AI) in the New Zealand primary sector is changing the way farmers operate daily, with potential to improve decision-making, efficiency, and economic contribution. At the same time, it is reshaping how farmers interact with rural professionals and redefining their role.

This report investigates how the use of AI-enabled technologies is impacting the skill set required of rural professionals to remain valuable, and the leadership capabilities that are needed to facilitate the change.

Through a mixed-methods approach, the research finds that the use of AI-enabled technology on farm is shifting the role of the rural professional from knowledge transfer to data interpretation and decision facilitation. As the access to data and information increases, the value of knowledge transfer decreases. However, the ability to translate information into an actionable insight increases in value. To enable this change, four capabilities were identified as crucial for the future success of rural professionals.

- **Data analysis & interpretation**– to identify meaningful insights from increasing volumes of data
- **Critical thinking** – to evaluate and validate output of AI, and ensure recommendations are grounded in existing farm system knowledge
- **Adaptability** – respond to ongoing change, and a range of technology expertise
- **Relationship building** – to ensure insights are trusted and actioned

Without these capabilities, AI-enabled technology risks poorer decision-making, slower adoption, and reduced return on investment for farmers. As a result, the New Zealand primary sector could miss out on productivity and profitability gains.

The research highlights a clear gap between current capabilities and those required in an AI-enabled primary sector. Over 50% of respondents did not feel well supported through this change. This showed the growing need for strong leadership throughout the primary sector.

The research shows that effective leadership in this context is less dependent on technical knowledge, and more focused on providing clarity, supporting capability development, and creating a safe environment for learning and experimentation. Without this, there is a risk that rural professionals may disengage with capability development, resulting in a loss of relevance and contribution to the New Zealand primary sector.

To address these challenges, the following recommendations are made from this report;

- Capability development: through structured and practical workshops, with real case studies or examples of AI being successfully implemented in rural professional roles, and on farm.
- Role definition: reposition rural professionals as data interpreters and facilitators of decision-making
- Enable change through leadership: create clarity and remove fear of job loss to allow rural professionals to engage in change

Overall, this report concludes that the success of AI in the New Zealand primary sector depends not only on the technology, but also the sectors' ability to develop people who can use it effectively. While AI is changing the work that's done, it is also increasing the need for human capabilities to interpret complexity, make decisions and build trust in a data rich environment. Without deliberate investment in capability development and leadership, there is a risk that the sector will fail to translate technological potential into productivity gains.

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1. Introduction

Generating $60.3 billion in export revenue, the primary sector plays a central role in New Zealand's economy (MPI, 2025).Improving the profitability and productivity of our primary sector is a key part of ensuring it continues to contribute strongly to our nation's economy. However, this is not easily achievable in a time when the primary sector is facing many challenges – labour shortages, increased costs of production, increased regulation and recording, as well as the implementation of emissions reduction plans.

Technology, in particular artificial intelligence (AI) enabled technology, is rapidly changing the world, unlocking productivity and profitability gains we never previously thought possible (AgFirst, 2025; AI Forum NZ, 2019; Rachel Durie, 2025; Rural News, 2026). Within global agriculture, AI-enabled technology is being applied to areas such as crop management, animal health, labour improvements, and scenario-based support (Allen, 2024; DairyNZ, 2025; Rachel Durie, 2025). If implemented successfully in the New Zealand primary sector, this technology can change the way that the industry is working and allow it to increase productivity in a sustainable way.

Due to New Zealand being a small country, bringing in technology can be challenging due to its inability to scale, which increases costs. Despite this, we are seeing growing demand for AI-enabled technology in the primary sector, with many people implementing it successfully in their business already. This ranges from low-cost and easily accessible technology such as ChatGPT, through to higher entry-cost technologies, including animal monitoring tools such as Halter and SenseHub (Rural News, 2026), and pasture management tools such as Aimer (Rural News, 2026).

Although there are some potential productivity gains from the uptake of AI-enabled technology in the NZ primary sector, adoption rates have been slow and not uniform (AgriTechNZ, 2022; Rachel Durie, 2025). New Zealand has challenges with adoption such as rural connectivity, data interoperability, perceived cost versus value, and uncertainty around adoption (AgriTechNZ, 2022; Federated Farmers, 2025; Rachel Durie, 2025). As a result, AI-enabled technology adoption in the primary sector is mostly centred around innovators and early adopters.

Not only is AI-enabled technology changing the way the world is working, it is also changing the roles of the future, and the skills needed to be successful (World Economic Forum, 2025). We are seeing this play out globally, and the New Zealand primary sector will be no different. One of the key needs for technology to be implemented successfully is a clear link to value, often through cost, time, or labour saving (AgriTechNZ, 2022). As technology uptake increases, rural professionals will be working alongside businesses to help with successful implementation.

Rural professionals have always played a key role in the success of the New Zealand primary sector and will continue to do so in this evolving landscape. However, the role may look different into the future. Traditionally, they have played a role in translating technical information into practical decisions, answering questions, and supporting on-farm change(Duker, 2019; Matheson, 2022). As AI-enabled technology is adopted, the demand for technical tasks is narrowing due to automation, and technical information is available at rapid speeds through AI-enabled technology (Rachel Durie, 2025). There is less value being placed on being the knowledge holder, and more being placed on using expertise to interpret the data, analyse it critically and align it with business goals (Matheson, 2022). For many rural professionals, this change will mean learning new skills to continue to add value to their clients.

To ensure that rural professionals working in the primary sector are supported into the future, there needs to be a strong focus on leadership capability to enable a smooth transition. As AI-enabled technology use increases, there are growing concerns over job security, relevance, and ethical security (World Economic Forum, 2025). Rural professionals will face change in their own companies, as well as externally with the businesses they work with. Leadership practices that support psychological safety, encourage learning, and provide clear guidelines for AI-enabled technology adoption will be crucial. This will be particularly important in the New Zealand primary sector, where adoption has been seen to be slow and uneven in some cases, so a range of skills and adaptability will be required.

This report argues that AI-enabled technology in the primary sector is repositioning rural professionals from technical experts to interpreters of data, and facilitators of decision-making. As a result, future success will depend on a combination of data literacy and human-centred skills, supported by leadership capable of navigating uncertainty, enabling learning, and maintaining trust.

2 Objective

The objective of this report is to investigate how the increasing use of AI in New Zealand's primary sector is influencing the skillsets required of rural professionals, and to identify the leadership capabilities needed to support them through this transition.

3 Literature Review

3.1. Introduction

This literature review examines existing research and industry insights relevant to the central question of this study: **how the use of artificial intelligence (AI) in New Zealand's primary sector is influencing the skill set required of rural professionals, and which leadership capabilities will be essential to support them through this transition.** Drawing on academic literature, industry reports, and policy documents, the review explores global and New Zealand trends in AI adoption, barriers and risks, and the evolving skill and leadership requirements of rural professionals.

3.2. International adoption

"AI has been a game changer in every aspect of the world, as well as in the agricultural revolution" (Ahmad, 2021)

While this research project will focus on the changes in the rural professional skill set, it is also important to understand how AI-enabled technology is being used on farm, and the problems it was adopted to solve. The uptake of AI throughout the primary sector is increasing with tools being used daily by farmers around the world. AI-enabled technology has been adopted to boost productivity, improve sustainability, and address labour shortages. Sustainability issues have been improved by tools such as HawkeEye pro, Techion & Cropsy that monitor soil, animal and crop health to enable targeted applications of inputs, reducing environmental impact. Another major issue in global agriculture is staff shortages. One example of AI-enabled technology being used to address staff shortages is the G2-200 LaserWeeder. This is a machine that uses AI-powered lasers to eliminate weeds without herbicides, capable of destroying 10,000 weeds per minute(Uys, 2025), limiting use of chemicals and staff required to spray or pick weeds.

While there is information available to support that there is an increase of AI-enabled technology across the primary sector globally, most of this data published is by the companies providing the product or service, and there is limited independent data to show trends in uptake.

3.3. New Zealand adoption

Understanding AI-enabled technology uptake at a global level is important, but it can differ to New Zealand uptake due to being a small country, which makes scaling and the cost of technology adoption a challenge (Rachel Durie, 2025). The New Zealand primary sector is not new to technology, with New Zealand being the home of many crucial primary sector inventions such as the electric fence (Bill Gallagher) and the rotary shed (Merv Hicks, 1969). One recent change in technology has been the increase of cow wearables, which often include AI-enabled technology such as machine learning. The pace of this change appears rapid with wearables in the dairy sector growing from 3% in 2018, to 18% in 2023 (DairyNZ, 2025). An independent study by AgFirst showed that of ten farms using Halter technology, there was a 13% increase in profit before tax, highlighting the productivity gains available through technology adoption (AgFirst, 2025).Since 2023, wearables have been available for beef herds in New Zealand. No national uptake statistics have been published yet but there is evidence to show growing interest and uptake across the country(Halter, n.d.). While this information supports the idea that New Zealand farmers are adopting technology, there is no geographic or demographic information available on this data to help understand the overall readiness of farmers in New Zealand.

Some other examples of technology available in New Zealand are included in the list below, however, there are no overall uptake numbers publicly available to indicate how widely they are being used.

- Halter & Aimer – Machine learning pasture monitoring systems, improving data quality without the need for the manual labour of measuring residuals.
- Bella (Beef + Lamb New Zealand), Ask FAR (Foundation for Arable Research) and Daisy (DairyNZ) are recent chatbots designed for New Zealand farmers, drawing on trusted resources, to help increase productivity on farm, and speed up access to quality information.

There is information available to support that New Zealand dairy farmers are experimenting with Generative AI (GenAI). It has been used for decision-support through rapid access to technical knowledge, analysis of farm data, and predictive modelling for scenario testing. One larger scale operation had created a customised farm chatbot trained to use farm policies and trusted websites to help staff make more informed, and faster decisions (Durie, 2025). The literature is confident that there will be substantial growth in GenAI uptake as tools become easier, more integrated and more trusted. However, adoption will increase at different speeds across the innovation-adoption curve (Figure 1), a detailed discussion of this distribution is provided in section 3.4. While this is the most recent and independent data available on uptake of AI-enabled technology, there was a small number (10) of farmer interviews and focus on AI awareness rather than overall adoption (Rachel Durie, 2025).

While technology and AI adoption appear to be growing on farm, there are still many limitations within New Zealand. These include internet connectivity, lack of data sharing (Allen, 2024), cost & proof of return on investment (AgriTech NZ, 2022). This is supported further by recent research that found the biggest barriers were whether the investment was cost-effective, the technologies can benefit the stakeholder and are reliable. (Georgopoulos, 2023).

Within the farm gate, the current adoption of GenAI is still in the early stages, with many unsure of the benefits, accuracy of results, and how it can integrate with their current data & systems. The motivation for change is low, with their current systems working well. (Rachel Durie, 2025). The motivation for change may be low because they are not aware of potential improvement gains, and have not seen proof of successful implementation. Rural professionals can add value in this space through education and sharing real life examples of productivity gains through implementation of AI-enabled technology.

3.4. Diffusion of innovation

The diffusion of innovation (DOI) theory, popularized by Everett Rogers in 1962, describes how and why people adopt new innovations or technology (Rogers, 2003). The DOI model describes the change as gradual and cumulative over time. It processes through innovators, early adopters, early majority, late majority, and laggards. However, due to the uncertainty and risk involved with the adoption of AI-enabled technology, it is more likely to follow later work by Moore (2006), that proposes there is significant disruption or discontinuity between early adopters and early majority, known as the 'chasm' (Figure 1)(Moore, 2006). For the purposes of this study, the chasm model provides the primary lens for understanding AI adoption and professional capability requirements.

This is supported by a recent New Zealand based study that showed that while the awareness of the Gen-AI tools such as ChatGPT has increased rapidly, meaningful adoption remains low and is largely constrained to the innovators and early adopters (Rachel Durie, 2025). These farmers are actively experimenting with advanced use cases including farm-tailored chatbots, digital twins and Gen-AI driven breeding tools. However, the cases that

have successfully crossed the chasm and are being used by the majority are basic, low risk activities, which have demonstrated proven value. These include using AI for drafting documents, emails, or standard operating procedures. These are seen as low risk, but have the potential to save time, or labour costs. The fast access to information through chatbots has allowed photos and text to be used to identify weeds, pests, diseases and machinery issues (Rachel Durie, 2025).

In the early stages of adoption there needs to be a willingness to invest time, tolerate uncertainty and work with incomplete data. To do this, there needs to be a clear benefit to the user. Durie (2025) suggested that early adopting farmers found the technology easy to use, minimal technical skill required to operate once it was set up, and they delivered immediate time or efficiency benefits (Rachel Durie, 2025). This is particularly important in the New Zealand Primary sector as most farmers are facing labour shortages and producing commodity products, so improving efficiency is a potential key driver to increasing productivity and profitability.

While this technology has been successfully implemented on farm, advanced Gen-AI applications have not crossed the chasm yet, despite the potential for productivity gains. These cases include that require a range of data sources and trust in the technologies decision making, such as automated grazing management and feed allocation. This supports the diffusion of innovation 'chasm' theory (Figure 1). AI-enabled technology in the New Zealand primary sector will depend on reducing the risks and barriers to uptake, including data interoperability, connectivity issues, lack of trust, and limited awareness of potential productivity gains.

For rural professionals, the chasm model is an important driver for future success. As AI-enabled tools increasingly shape on farm decisions, there will be an increased need for rural professionals to interpret data, apply critical thinking to outcomes and ensure the recommendations are practical. To implement this successfully, rural professionals will need to understand the farmers or growers they are working with, and where they are placed on the DOI model, to provide effective support to the individual or business.

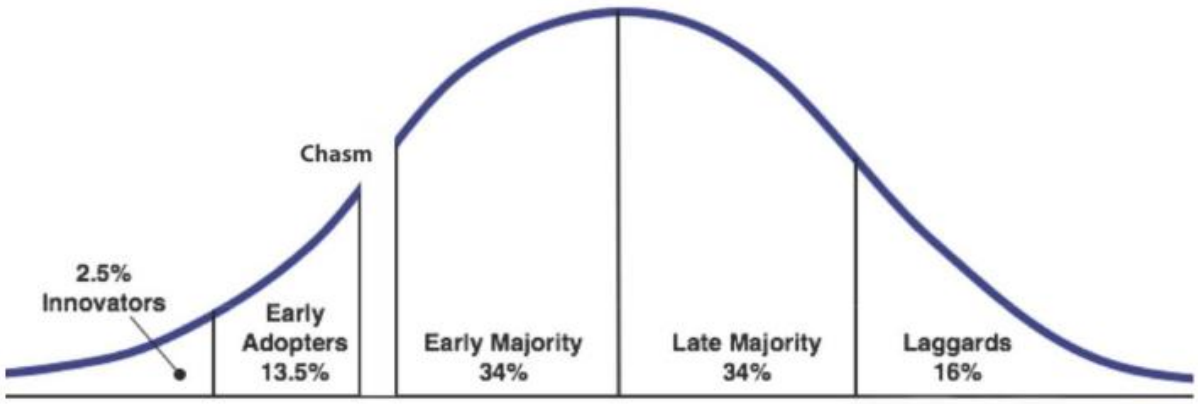

Figure 1'Chasm' concept diffusion of technologies (Moore, 2006)

3.5. Barriers to adoption AI-Enabled technology

While there are clear benefits to the adoption of AI-enabled technologies in the NZ primary sector, there are still barriers which may be preventing uptake. One of the key barriers in New Zealand is a lack of connectivity. A study completed in 2022 by AgriTech reported that 33%

of growers and farmers described their mobile coverage as poor, and 19% described their internet connection as poor. The study comments that connectivity alone is not enough to stop the adoption of technology, however one of the benefits of AI-enabled technologies is speed of information, which will be reduced in areas of poor connectivity. This may also limit the ability of AI-enabled technologies to integrate with other on-farm tools or increase the cost to implement by demanding satellite technology, or transmission towers, to operate technologies. The 2025 rural connectivity report by federated farmers reported there was little improvement, with 35% of farmers saying coverage has declined (Federated Farmers, 2025). However, it is important to note that Federated Farmers is an advocacy group for the New Zealand Primary industry, so there may be some bias in reporting, but there is very limited other information available on connectivity.

It is widely reported that labour continues to be a key challenge for the New Zealand Primary sector (AgriTech NZ, 2022; Allen, 2024; Rachel Durie, 2025). In the long term, AI-enabled technologies could play a role in improving efficiencies on farm to reduce the need for staff or improve staff management practices. However, in the current time it means that many farming operations in New Zealand are understaffed, which puts time constraints on those doing the day-to-day operations. This fact, combined with the adoption curve of technology, may create a barrier where farmers do not allocate the time to learning new technologies. If they are happy with how their farming system is performing, there will be little motivation to change (Rachel Durie, 2025). These farmers may need additional support from the rural professionals they work with to encourage them or ensure they have a good user experience with AI-enabled technology.

Maintaining profitability is a key driver for most in the New Zealand Primary Sector. With many farmers producing a commodity product, they are constantly facing the challenge of rising input costs with little control of the price received for their product. While there is evidence that implementing AI-enabled technology on farm could provide cost-saving opportunities, there is also a cost to accessing this technology. The investment changes from very low cost such as Chat GPT subscription, $20USD per month, to very high investment such as cow wearables, which requires hardware and software to be installed on farm. There will need to be a clear value proposition and a return on investment for farmers to implement any AI-enabled technology, to ensure they are maintaining profitable and sustainable business.

Data sharing remains a key barrier to the adoption of AI-enabled technology, as getting maximum value relies on high quality, interoperable data. Data sharing has improved in the New Zealand Primary Sector through industry-lead initiatives, especially in the dairy sector(Kay, 2025), however this area still needs more focus at a sector level.

3.6. Risks to the adoption of AI-enabled technologies in the primary sector

Along with barriers to use, there are also some key risks to the adoption of AI-enabled technologies in the New Zealand primary sector. It is important to acknowledge the risks associated with new commercial technology, as often the incentives are greater to identify the benefits, especially in the private sector(Sparrow et al., 2021).

3.6.1 Bias

One risk to widespread adoption of AI-enabled technology in the New Zealand primary sector is the accuracy of data and outputs (Mark, 2019). Machine learning systems are highly dependent on the quality of data they have been trained on. Any inaccuracies, biases or issues within the data may impact the accuracy of future outputs. In agriculture, this could mean that some AI-enabled tools struggle to adapt to local conditions, especially if they have a limited data set. This could be an issue for farmers using AI-enabled technology to help with crop or pasture growth, animal health or breeding selections (Sparrow et al., 2021).

This will demand users, and those supporting users, to be trained in critical analysis to ensure the technology is used successfully. Many farm uses of AI-enabled technologies relate directly to areas such as animal or plant production and health. It also raises the question of who is responsible for poor outcomes based on information from AI-enabled technology, there is little discussion about this in the available literature, but it may be important for future conversations and further confirms the need for strong critical analysis skills. The New Zealand primary sector faces challenges in data quality. It is a small country, with limited data sets, few incentives to record accurate data and in the early stages of data sharing, these factors may impact how accurate AI-enabled technologies will be.

3.6.2. Data sharing

While data sharing is key for improving the accuracy of AI-enabled technologies in the primary sector, there are real risks when this is done without transparency, clear rules, and quality assurance processes. There needs to be clear information about what data is being collected, who has access to it, and how it may be used in the future. In the New Zealand primary sector, Agritech NZ (2022) found that the concern for data privacy was low, of the farmers or growers sharing data 64% of them had confidence in the custodians of their data, and 77% of them were happy to share data when there is a direct benefit. However, there was clear evidence in the survey that there was a low recognition in the value of data, and difficulty seeing value in shared data (AgriTech NZ, 2022).However, international studies and popular press indicate that lack of transparency, accountability, and privacy safeguards is likely to slow the adoption of AI-enabled technologies (Dara, 2025; Gardezi et al., 2024; Sparrow et al., 2021).

Overall, the literature highlights that while AI-enabled technologies offer significant potential for the New Zealand primary sector, there are technical, ethical and trust-based risks that constrain it. There are other key risks such as environmental impact, job displacement, and ownership and accountability concerns, which may impact farmers uptake levels, particularly in the early stages.

3.6.3. New Zealand Policy

New Zealand's AI policy settings are now defined by a national AI strategy that is deliberately adoption focused. The Ministry of Business is clear that countries embracing AI will have a competitive advantage going forward. The AI-strategy is designed to encourage New Zealand to make the most of these opportunities. New Zealand has adopted the Organisation for Economic Co-operation and Development (OECD) principles, which ensures they are managing risks responsibly and focusing on human-centred values (Ministry of Business, 2025; OECD, 2024).

3.7. Changing skill sets of Rural Professionals

The term rural professional covers a wide range of people across the primary industry, from levy body organisations to private advisors or salespeople. Duker (2019) described a rural professional as someone who "*works within the agricultural sector to support farmers in the theory and practice of farming. Rural professionals help farmers become better farmers*". This work also asked a range of participants the desired attributes of a rural professional (Figure 2). This research showed that trust was the most desired attribute, followed by technical-expertise, adding value, empathy and relationships. These traits are widely considered as the traditional skill set of rural professionals (Duker, 2019).

Like any industry, the primary sector is characterised by change. The innovation frontier (Figure 3) is not the first time rural professionals have needed to adapt their skill sets, Duker (2019) identified that public perception, regulation and compliance pressures as key drivers

that have previously required rural professionals to shift their practices to support farmers under pressure. This research emphasised the importance of investing time into building trusting relationships, a finding reinforced by Allen (2022), who describes soft skills as paramount to being successful as a competent rural advisor.

Figure 2. Attributes of a high performing rural professional (Duker, 2019)

As farming becomes more digitalised, we need to remember that data is only as valuable as the interpretations drawn from it. The literature repeats that raw data holds little meaning without informed analysis(Haley, 2021). Data interpretation is therefore emerging as a critical competency, requiring rural professionals to recognise inaccuracies, understand limitations

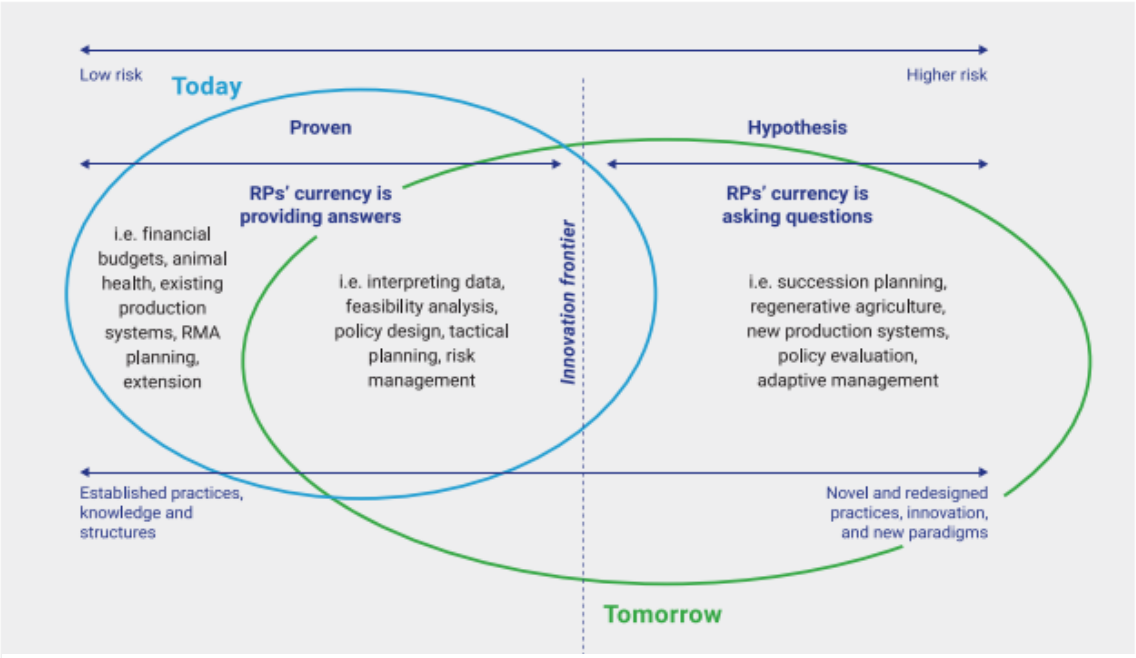

Figure 3. Primary Industry Advisory Framework (Matheson, 2021)

and translate complex data sets into clear, actionable insights. This capability is particularly important in an AI-enabled environment, where farmers are increasingly using these tools for decision support.

Farmers acknowledge that while AI-generated information isn't always right, the speed often enhances decision-making, with perceived benefits outweighing potential inaccuracies (Durie, 2025). This reinforces earlier discussions around data bias and uncertainty and suggests that rural professionals will need to have high levels of data literacy, critical thinking and analytical capability to provide effective support in this environment.

Figure 3 illustrates a broader transition in the role of rural professionals, from being primary holders of knowledge to applying their expertise through interpretation, facilitation and critical analysis (Matheson, 2021). As technical information becomes more readily available through AI-enabled tools, the diversity and volume of ideas is likely to increase. This shift places a greater responsibility on rural professionals to support decision-making through synthesis and evaluation, ensuring outcomes align strongly with business goals and values, rather than simply providing the technical answers.

Importantly, rural professionals must navigate this change both within their own organisations and externally with farmers or growers. This may be a challenge when different individuals and teams are positioned at different points on the innovation-adoption curve (Figure 1). This highlights the need for effective leadership in the primary sector to support capability development, manage uncertainty and enable meaningful engagement with new technologies.

3.8. What isn't changing?

Despite growing technology capability, there are several core competencies that remain fundamental to being a successful rural professional. Given that the uptake of digital and advanced technologies within the New Zealand Primary sector remains uneven and relatively low (AgriTech NZ, 2022), it is important that rural professionals continue to draw on their traditional skills of knowledge transfer, along with interpretation and translation of data. Rural professionals work with a highly diverse client base, including varying levels of technological confidence, capability, and readiness for change. Maintaining foundational skills enables rural professionals to bridge gaps between emerging technologies and practical on farm applications is important.

The growing diversity of client bases will increase the need for strong collaboration within the industry. As technology becomes more embedded in farming systems, subject matter experts on technology and technical knowledge will need to work together, often on equal footing, to ensure solutions delivered to farmers are efficient and trustworthy. Allen (2023) argues that as technical tasks are automated, the value of rural professionals will shift from the delivery of technical answers towards sense-making and facilitation of the data. In this environment, collaboration between people, and between people and digital systems, becomes a core capability rather than an optional one.

While relationship building and trust has always been an important part of the rural professional model (Duker, 2019), the literature supports that there is a growing need for this to remain a focus as technology adoption intensifies. Matheson (2022) highlights that as farmers and growers gain more access to information and analytical tools, the role of the rural professional will be less about owning the knowledge and more about supporting clients navigating uncertainty, trade-offs and ensuring the decisions align with their business goals and values. This supports the literature that interpersonal skills such as communication, coaching, understanding people and challenging assumptions will become increasingly crucial to remain successful.

These findings align with global work force trends. The *Future Jobs report* published by the World Economic Forum, that reports that nearly 40% of job-related skills are expected to change due to increased use, and development of AI, with skills gaps identified as a major barrier to transformation. Importantly, the report emphasis that future success in the workplace will require a combination of data literacy and human skills (World Economic Forum, 2025), suggesting that rural professional's relationship and interpretation skills will remain critical as the sector evolves.

3.9. Leadership Capabilities needed for AI-Driven Change

"The time is now for businesses and governments to work together, invest in skills and build an equitable and resilient global workforce." (World Economic Forum, 2025)

The literature reviewed indicates that there is a need for rural professionals to adapt their thinking and their skill sets to ensure they continue to add value to the primary industry as AI-enabled technology becomes more prevalent (Allen, 2024; Lee Matheson, 2022). However, this adaptation cannot occur in isolation. Effective leadership within organisations and across the wider sector is crucial for supporting rural professionals through this transition. Leaders play a central role in creating psychologically safe environments in which learning, experimentation and skill development can occur without fear of failure.

As AI use increases globally, concerns about job displacement have intensified. The World Economic Forum reported that 92 million jobs will be displaced by 2030, however, up to 170 million new jobs are expected to emerge (World Economic Forum, 2025). Despite this net growth, the pace of change has created a significant skills gap. There is a strong call to action in the World Economic Forum for urgent and collective action from government, business and education systems to address the growing skills gap, reskill and upskill employees to ensure viable pathways to future jobs (World Economic Forum, 2025). For rural professionals, this uncertainty heightens the importance of leadership that provides clarity, direction and reassurance.

The Protection Motivation Theory (PMT) provides a useful framework for understanding employee responses to AI-driven change. PMT explains behaviour through two cognitive processes: *threat appraisal & coping appraisal* (Marikyan, 2023). In AI-enabled workplaces, perceived threats such as job loss, loss of relevance, or reduced professional identity may be high. While coping appraisals may be low due to limited training opportunities or uncertainty about future skill requirements. When these conditions coexist, individuals may adopt maladaptive responses such as denial, resistance, or avoidance. This response is particularly relevant for rural professionals near the "chasm" (Figure 1), where uncertainty and aversion are highest.

To lead teams effectively into an AI-enabled world, leaders must demonstrate change-oriented leadership. That includes communicating a clear purpose for the adoption of AI, modelling openness to ways of working, and actively supporting skill development (Yin et al., 2024). By framing AI as an opportunity for growth rather than a threat, fostering psychological safety, and reinforcing the idea that human expertise and AI can coexist, leaders can reduce fear-based resistance and shift teams from avoidance toward active learning and collaboration (Yin et al., 2024). Although the work of Yin et al. (2024) is based in the tourism sector, the leadership principles are highly transferable to the primary sector.

Practical guidance from online articles reinforces these findings, emphasising the importance of clear and transparent communication about AI use, accessible learning support, permission to experiment and fail, and visible leadership commitment throughout AI transformations (London School of Economics and Political Science, n.d.). These leadership

behaviours are especially important in sectors experiencing uneven technology adoption like the New Zealand primary industry.

However, the focus cannot centre solely on technical capability. The rural professional role is deeply grounded in human interaction, with skills such as empathy, trust-building, and relationship management remaining central to effectiveness (Duker, 2019). These capabilities, commonly described as soft or interpersonal skills, enable collaboration, communication, and complex problem solving (Srivastava, 2023). However, research suggests that such skills are in decline across multiple generations. Employers report that younger workers, including Gen Z, often lack core interpersonal skills such as communication, teamwork, leadership and negotiation(Visser & Terblanche, 2025). Older generations have also experienced a similar decline of soft skills due to increased digital mediation and the impacts of COVID-19 (Breaux et al., 2023; Hooker, 2016).

Together this evidence reinforces the need for leadership approaches that deliberately cultivate both technical capability and interpersonal skill development. For rural professionals operating within AI-enabled systems, leaders need to support not only technological literacy, but also human capabilities required to build trust, interpret complexity, and guide decision making. These leadership qualities will be critical for enabling individuals and organisations to cross the AI adoption chasm and sustain value creation within the primary sector.

Gaps in literature

While the literature addresses AI adoption in agriculture, technology barriers, and workforce transformation, there is limited New Zealand specific research examining how AI use is reshaping the skill requirements of rural professionals or how leadership supports them through this transition. This research addresses this gap by drawing on experience from rural professionals through interviews and surveys to explore evolving skill needs, perceived preparedness, and leadership capabilities required to enable effective AI-enabled change in the primary sector.

4 Methodology

This project uses a mixed-methods approach to address the research objectives, combining a literature review, qualitative semi-structured interviews, and a quantitative survey. This approach allows the research to consider a wide range of perspectives on how the use of AI-enabled technology is influencing the skill sets required of rural professionals in New Zealand, as well as the leadership capabilities needed to support this transition.

4.1 Literature Review

A structured literature review was undertaken to establish the current knowledge on this topic. Sources included peer-reviewed academic journals, industry and government reports, sector publications, popular press articles, and research relevant to agriculture or technology adoption. Insights from the literature review were used to develop the interview and survey questions, as well as identifying knowledge gaps that this research could address.

4.2 Qualitative Interviews

Semi-structured interviews were conducted with three groups.

- Farmers, to understand the expectations, experiences, and perceptions of AI-enabled tools, as well as their relationships with rural professionals.
- Rural professionals, to explore how AI is influencing their roles and capability requirements.
- Industry leaders, to gather strategic perspectives on sector readiness, leadership capabilities, and workforce development.

Participants were selected to ensure representation across different sectors, geographic regions, age groups, and levels of experience with digital technology. Interviews were conducted in a semi-structured format, allowing for consistency across discussions while giving participants flexibility to share experiences and insights. Interviews were recorded with consent and transcribed for analysis. Interview data was analysed using thematic analysis, with responses coded into key themes.

4.3 Quantitative Survey

A survey was undertaken to understand the wider view of attitudes, capability levels, and support needs related to AI across the primary sector, designed to complement and support insights gained from the interviews. It included a mix of Likert-scale, multiple-choice, and demographic questions, along with open text responses to capture additional insights. Quantitative findings were compared with qualitative insights to strengthen interpretation and the validity of findings.

4.4 Ethical considerations

The interview (Appendix 1) and survey (Appendix 2) questions were approved by the Lincoln University Human Ethics Committee, and a copy of these questions can be found in the Appendix. Participants were informed of the purpose of the research, and informed consent was obtained prior to interviews and surveys taking place. All data was anonymised and stored securely, and participants were able to withdraw at any stage. Microsoft Copilot was used during the report development process to help clarify ideas and improve writing clarity, grammar and spelling. Microsoft Copilot was not used for coding or thematic analysis of interview transcripts.

5 Results

Nine people were interviewed: Three dairy farmers, three rural professionals, and three industry leaders. An industry leader was defined as someone working in the primary sector who leads a team of farmer-facing staff. Thematic analysis was used to highlight key themes from these results.

A quantitative survey was conducted alongside the interviews to reach a broader audience across the sector. The survey results were used to support the themes identified in the interviews.

5.1 Respondents

The quantitative survey had 70 respondents. Of that group, 47 were rural professionals, and 24 were farmers.

The survey aimed to capture perspectives from participants with diverse roles and levels of experience across the primary sector. Figure 4 shows that while most respondents were from a dairy background (70%), there was representation from across the main primary sectors in New Zealand.

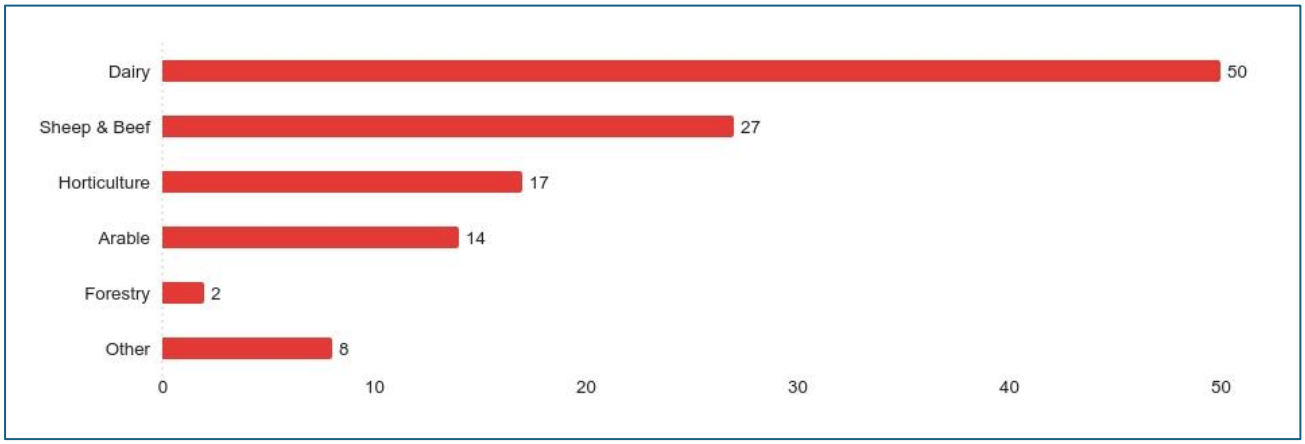

Figure 4. Response to survey question 3: Primary sector type?

Along with sector type, it was also important to get a range of experience and familiarity with AI-enabled technologies to ensure all perspectives were considered. Figure 5 shows that there was a relatively even spread of tenure within the survey respondents, with 23% being 0-5 years, 29% being 6-10 years & 11-20 years, and 20% with 20+ years' experience in the industry. Figure 6 shows that over half of the respondents (52%) were moderately familiar with using AI-enabled technology, and only 3% were not familiar at all.

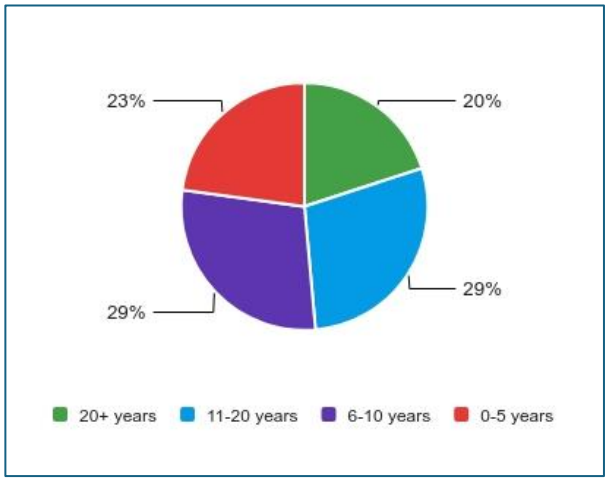

Figure 6. Response to survey question 4: How long have you worked in the sector?

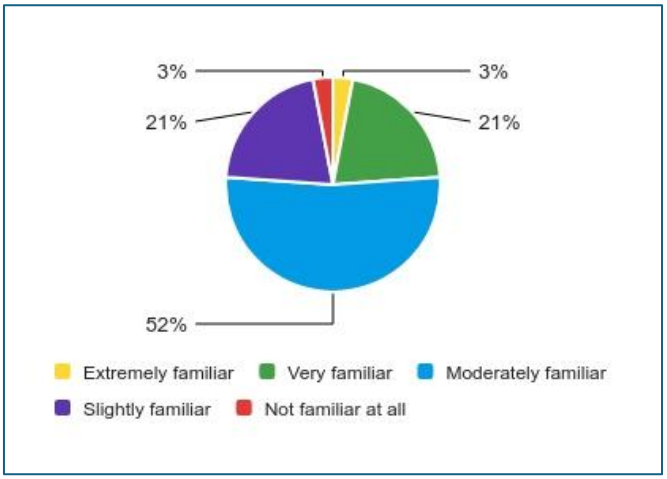

Figure 5. Response to survey question 6: How familiar are you with AI-enabled tools?

5.2 Use of AI in the primary sector of NZ

During the interviews, the impact and use of AI-enabled technology was discussed, and interviewees reported that the use of AI-enabled technology is increasing. Of the three farmers interviewed, all of them stated that "*the day starts on the phone*" to see what requires immediate attention from a range of applications and technologies linked to their farm. All farmers interviewed were operating different levels of AI-enabled technology with varied levels of confidence, however, they all agreed that they expect the use of AI-enabled technology to increase on farm in the future. One farmer reported using ChatGPT in an advanced way, including creating farm scenarios and mating plans, while another used it once or twice per week for basic questions.

Interviewees identified that adoption of new technologies depends on a clear link to value on-farm, including labour savings, time efficiency, cost reductions, and improved data quality, with one farmer stating, "*Unless it's meaningful, why would I use it?*". All interviewees, including rural professionals and industry leaders, reported that the increased use of AI-enabled technology has the potential to unlock productivity gains within the primary sector. This is supported by the survey results shown in Figure 7, which shows 76% of respondents believe that AI-enabled technology will have a large or significant impact on the primary sector. No respondents reported that AI-enabled tools would have no impact.

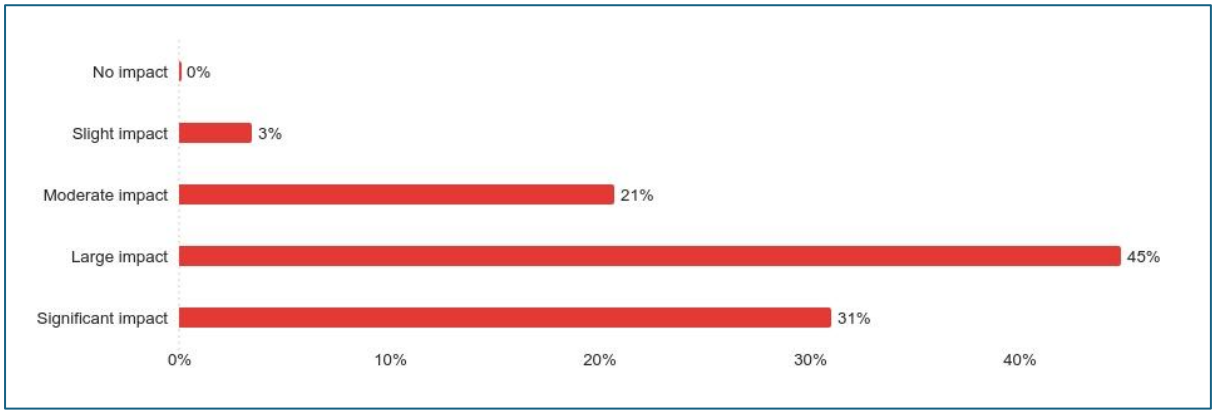

Figure 7. Response to survey question 8: What impact do you think AI-enabled tools will have on the primary sector in the next 5-10 years?

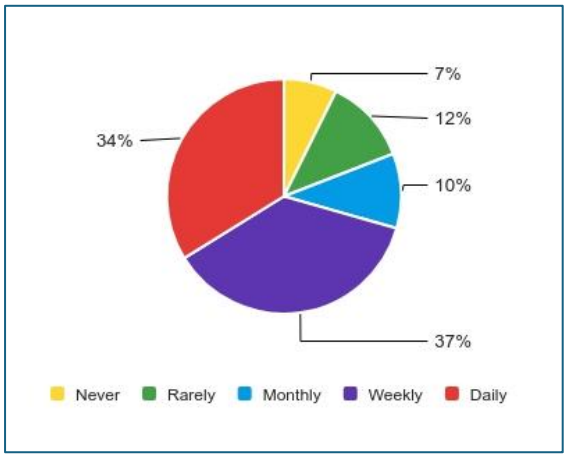

Figure 8. Response to survey question 7: How often do you use AI-enabled tools?

The survey results showed there was a wide range of confidence levels and frequency of use of AI-enabled technologies, with 7% of respondents reporting no use and 34% reporting daily use (Figure 8). The industry leaders interviewed observed a clear divergence within their workplaces already, with some staff adopting AI-enabled technology effectively, and others being slower with uptake, or using it in very basic ways. They noted that capability gaps are widening, and that they are seeing the results reflected in performance output, with one of the industry leaders commenting *"The range is just getting wider. Some people are getting massive productivity gains out of this stuff, and others just aren't touching it at all."*.

5.3 Skill sets of rural professionals

5.3.1 Need for change

The results of the survey, and interviews conducted during this research have shown that there will be some change to the skill set of the rural professionals required because of the use of AI-enabled technology in the primary sector. Figure 9 shows that all survey respondents thought some change would be required, with 49% expecting the change to be large or significant.

Farmers interviewed believed the reasons they contacted the rural professionals working with their business had changed over recent years. However, between the three farmers interviewed, there was a large difference in needs, based on the level of confidence and interaction they had with technology. The highest user felt there was less of a need for some rural professionals, especially those doing transactional sales, but still wanted support at a higher level. The participant expressed that he no longer needed help identifying products, processes or services that worked for their farm, as this can be done by using AI-enabled tools to compare options. They are more focused on using data and AI-enabled tools they have created, alongside existing technology and data sets provided by a company, to provide deeper and more personalised insights. Due to these needs, they often reach out directly to those in specialised roles within a company, rather than general company representatives. The lower users of technology still expressed a need for rural professionals to support their business but commented that their needs were changing. They have more access to technical knowledge now, but still want support implementing it in their business, or making sense of the information or data.

Rural professionals and leaders interviewed described very similar trends to the farmer group. They felt the requests they have had over the past year had changed, particularly for farmers receiving large datasets on their farms.

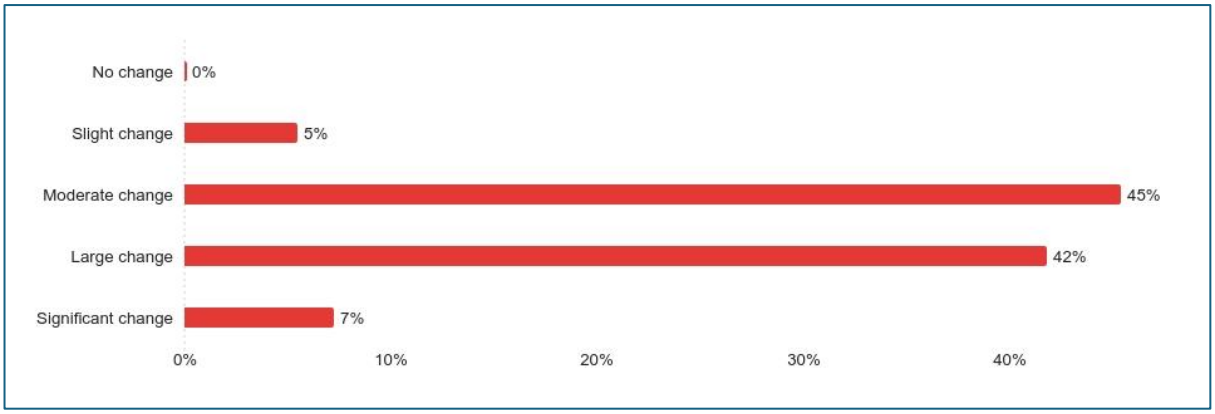

Figure 9. Response to survey question 11: To what extent do you believe the skillset of rural professionals will need to change due to AI-enabled technology?

5.3.2 What does change look like?

The interviews highlighted that there are key skills that rural professionals need to develop to continue to be successful. They have been grouped into four main skills – Data analysis, critical thinking, adaptability & relationship building.

i. Data analysis

A strong theme that emerged was the need to develop strong data analysis and interpretation skills. The farmers interviewed felt overwhelmed by the data they were receiving for their businesses and did not feel like they were receiving valuable insights that they could turn into actions. Interview participants reported a data literacy gap, with farmers reporting difficulty translating data into actionable insights. This was reflected in the statement: "*I don't need more data – I need better questions asked of the data I have*". This is consistent with the survey results shown in Figure 10, which shows data analysis as the most important skillset required for rural professionals in the future.

Participants reported that value increasingly lies in extracting deeper insights from data and applying them to decision-making. The data literacy gap between rural professionals is already becoming evident. One rural professional highlighted there are several rural professionals who have strong farm system knowledge, but low skills and confidence with large data sets, which may cause them to lose relevance. Developing data analysis skills will be important for their future success, to meet the growing farmer need. Farmers interviewed have also identified this as a need and commented they are preferring to work with businesses that are looking for insights within the data, summarised by a farmer quote "*Some companies are good at collecting the data, but aren't always good at getting the insights to the farmer*".

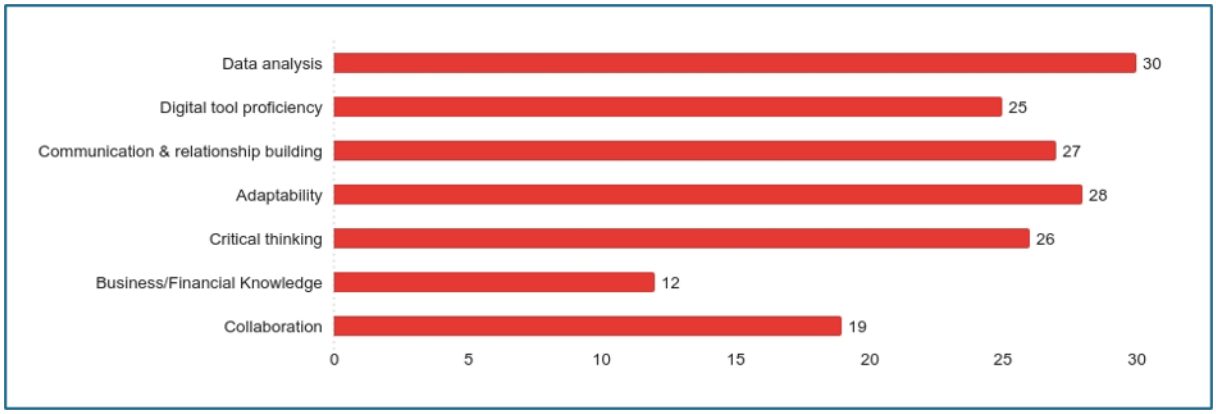

Figure 10. Response to survey question 12: What skills do you think will become important?

ii. Critical thinking

While data analysis focuses on working with the data, critical thinking is required to evaluate the outputs. One of the biggest concerns demonstrated in the interviews and survey results was around incorrect or biased information being used for decision-making, which participants noted could negatively impact business outcomes, especially when they are dealing with a biological product and environmental influences.

Interviewees indicated that an increased focus on critical thinking will become more important, not less, in an environment using AI-enabled technology. Interviews emphasised that the challenge was no longer access to data, but the ability to question, contextualise and evaluate data. This was summarised well by a participant that stated, "*Technology doesn't remove the need for judgment – it sharpens it*". Rural professionals similarly described a shift in expectations, noting their role increasingly involved helping farmers interpret results, identify causes, and prioritise actions.

Participants from the farmer and rural professional group commented that there are situations on farms, particularly in the dairy sector, where there are large volumes of data available, but few relevant or actionable insights. Participants consistently emphasised the importance of critical thinking when using AI-enabled technology to maximise the value of these data sets. This is reinforced by the survey results in Figure 10, which showed critical thinking as a key skill needed to be successful in the future.

iii. Adaptability

Adaptability was the third capability that emerged from the interviews and survey results (Figure 10). Participants linked this shift to ongoing changes in the industry and increased adoption of AI-enabled technology. Interview participants commented that the role had evolved over time, with an increased emphasis on data interpretation, technology support and facilitation of decision-making, rather than task-based advice. This is a response to the ongoing change in the industry, and uptake of AI-enabled technology, that has changed how rural professionals add value.

A key dimension of adaptability is related to the wide variety and divergence of farm businesses that rural professionals work with. While this has always been a factor, the divergence was reported as becoming larger in recent years. Participants suggested that this divergence is partly due to uneven technology uptake. However, other factors such as scale and system complexity were also noted.

Farmers interviewed stressed the importance of rural professionals who could recognise these differences and adapt their approach and advice accordingly, rather than applying

standardised solutions. Industry leaders supported this, noting that effective professionals must navigate a range of businesses and people, requiring flexibility in communication, as well as pace and depth of analysis.

Industry leaders also highlighted the importance of adaptability within organisations, particularly given the rapid pace of technological change. Adaptability will include a willingness to experiment and potentially be inefficient while learning new ways of working. Farmers commented they had respect for rural professionals who continued to evolve with their farm business and technology, and adjusted recommendations as more information became available.

iv. Relationship building

Relationship building emerged as an increasingly important capability for the rural professionals interviewed (Figure 10) as the use of AI-enabled technology expands across the primary sector. Interview participants consistently described relationship building as a key capability of a successful rural professional, and that the use of technology has not reduced the importance of trusted relationships. Participants reported that the importance of strong relationships is expected to increase as technology use expands. This was captured by an industry leader's observation: "*People generate the stuff that goes into AI, and people use the stuff that comes out of AI.*"

Farmers interviewed noted that as AI-enabled technology enables easy access to information and analysis, their engagement with rural professionals is becoming more targeted. All farmers interviewed said that while demands are changing, they still value a rural professional who has taken time to learn their business and goals, can communicate effectively, and support their decision making.

Similar views were expressed by rural professionals and industry leaders, who described a shift from knowledge delivery to knowledge interpretation roles. Value will be placed on a rural professional who has built strong relationships with customers, allowing them to translate the data effectively, and improve outcomes. All participants agreed that the data or information alone does not create action. For meaningful insights to turn into actions, and create value, the rural professional needs to have a deep understanding of the business, and the communication skills to deliver the insights and next steps in a way that is well-received by the individual or business. Understanding the farmers goals and objectives and linking the insights back to them is an integral part of relationship building, which will help create action. This is supported by survey participants, who noted that "*The interface between reports and technical data is human connection and conversation. These skills have always been, and will continue to be, the most important*".

Industry leaders also commented that while relationships with external customers are crucial, there is also a growing need for strong relationships within businesses, as going forward there will be an increased need for collaboration between subject matter experts. The example used was technology experts working with farm systems experts, which is likely cross-generational. Along with this, there will be a growing need for empathy, as rural professionals support a variety of customers, from low to very high-tech users. This will require adaptability, and the interpersonal awareness skills to ensure the support given to each customer is appropriate for their interaction levels.

5.4 Leadership capabilities

With the growing need for skillset change within the rural professional industry, it is important that rural professionals are well supported by their workplace, to create a safe space for change. Currently, only 35% of survey respondents felt they were well supported by their companies through the change, and 50% of respondents felt they were only supported slightly well or not at all well (Figure 11). These findings indicate low perceived levels of organisational support for AI-related change.

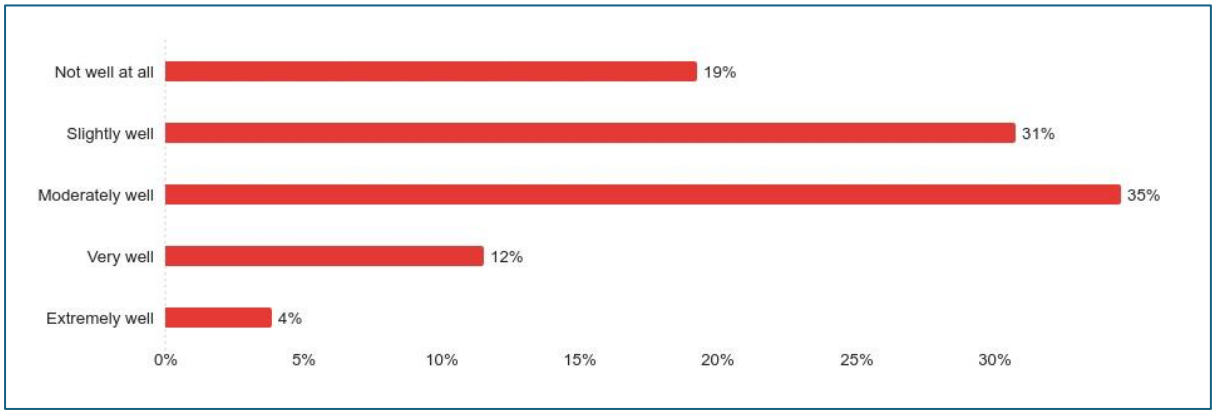

Figure 11. Response to survey question 13: How well supported do you feel by industry leaders or organisations through digital/AI changes?

The interview and survey results highlighted that to help rural professionals develop their skill sets, leaders in the industry needed to have the ability to lead through uncertainty, to create safe, trust-based environments, and to provide structured learning pathways.

A strong theme that emerged throughout the interviews was the changing demands of farmers and how the traditional rural professional role was changing. Interview participants highlighted that leaders must navigate uncertainty as roles evolve. Participants emphasised that leadership in this context involves acknowledging uncertainty and supporting ongoing learning. This was particularly important for the two human skills, adaptability and relationship building. Leaders highlighting the value of these and reinforcing that the importance is increasing rather than decreasing with the adoption of AI-enabled technology in the primary industry, will be a key capability to facilitate change.

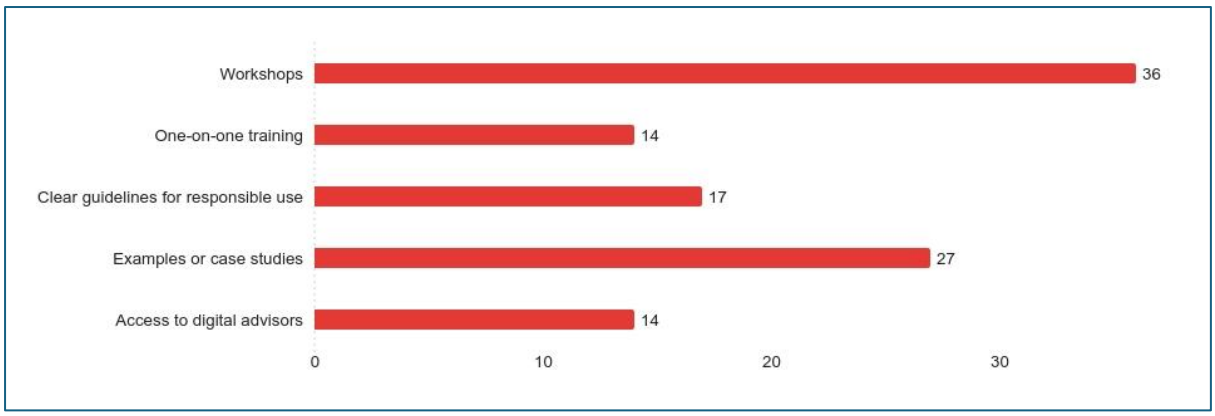

Figure 12. Response to survey question 14: What support would be most useful to help you transition to using more AI-enabled tools?

To facilitate change of the technical-based skills, the interviews and survey respondents showed that structured learning such as workshops (n=36) or examples and case studies (n=27) would be the preferred learning styles, as seen in Figure 12. Industry leaders

interviewed noted the importance of recognising capability gaps and bringing in external expertise into businesses to assist with training and capability development. All participant groups in the interviews emphasised the importance of psychological safety in supporting skill development.

6 Discussion

The findings of this research indicate that the increasing use of AI-enabled technology is not just changing the tools used in the primary industry but is fundamentally reshaping how value is created by rural professionals. As access to data and automation through AI-enabled technology increases, value shifts away from knowledge transfer, and towards interpretation, judgement, and human-centred capabilities. This fundamentally changes the role of rural professionals, requiring a rebalancing of skills. However, a critical tension emerged: 50% of respondents reported feeling unsupported through this change. This suggests that the industry is facing a challenge of skill development, but also one of leadership capability and organisational readiness.

6.1 Changing skill set of rural professionals

6.1.1 Data analysis

The growing use of AI-enabled technology has increased the data sets available at a farm and industry level. The use of wearable technology in the dairy and beef sectors is a key driver of this change (DairyNZ, 2025; *Halter*, n.d.). The findings suggest that increased data does not automatically lead to better decision-making. Instead, it often increases complexity and cognitive load, creating a "data-rich but insight poor" environment. To use the data available to improve farm performance, there needs to be relevant and practical insights derived from it. This shifts the primary point of value from collecting and reporting data, to extracting meaningful insights that inform real world decisions. This is supported by research that stated raw data holds little value without informed analysis (Haley, 2021). Currently, increased data is not improving decision making but instead adding complexity and contributing to feelings of overwhelm. Without sufficient data analysis capability, increased data may reduce decision quality rather than improve it.

The concern around this from rural professionals and industry leaders interviewed is that lack of data analysis capabilities creates a risk that AI-enabled technologies will fail to move beyond early adopters, limiting overall productivity gains to the industry. This scenario is visualised by the 'chasm' in Figure 1. Technology that does not have a clear link to value will not cross the chasm, and uptake will be limited to innovators and early adopters (Moore, 2006). Of the farmers interviewed, the range of use was wide, which shows a similar level of uptake and variance to the work of Durie (2025). Lack of adoption is a risk to the primary industry in New Zealand as efficiency gains are needed to continue to contribute to the wider New Zealand economy, while also addresses sustainability, environmental and labour shortages.

Recent research by Duker (2019) did not identify data analysis as a desired attribute of a successful rural professional, which demonstrates the need for development, and the current pace of change in the industry. This was evident in interviews with farmers, where they reported frustrations with businesses that were not offering insights, or felt as though they were learning how to process the data to provide insights at the same time as their service companies. This sentiment was also echoed by a rural professional who commented *"The data sets that we're getting are new. So, we're all learning at the same time"*. This reduces the traditional knowledge gap between farmers and rural professionals, increasing pressure on rural professionals to demonstrate value beyond technical expertise. Rural professionals also expressed concerns about the scalability of this service and did not believe they could do this for every client with their current capabilities.

The research also showed that this capability must still be supported by strong farm systems knowledge. This is crucial to enable critical thinking and ensure that the way the data is

being analysed is correct and applied in the appropriate context, especially when working with a biological product exposed to an ever-changing environment. Although farmers are increasingly using AI-enabled tools to receive rapid information (Rachel Durie, 2025), there are still concerns about its accuracy in the New Zealand primary sector. As a result, the capabilities identified cannot be developed in isolation, otherwise there will be a risk of identifying meaningless insights and having negative outcomes.

Participants interviewed reported one of their concerns as the potential for rural professionals with less technology ability to be left behind as the adoption of AI-enabled technology is increased. This concern, combined with overwhelm of data, creates the risk of rural professionals disengaging with upskilling, as reported in the protection motivation theory (Marikyan, 2023). To avoid this, leaders must ensure they are providing the correct training and helping individuals prioritise what is meaningful to support the development of data analysis and interpretation. Without this shift, there is a risk that the sector becomes increasingly "data-rich but decision-poor," where the volume of information exceeds the capacity to translate it into meaningful action.

6.1.2 Critical thinking

A key capability identified was the need for rural professionals to improve critical thinking as the use of AI-enabled technology increases on farm. Most concerns over lack of accuracy, data bias, and information being applied without context. This is consistent with global research showing the adoption of AI-enabled technology without strong critical thinking capabilities could have negative impacts on farm performance (Sparrow et al., 2021). This concern emerged in two forms: ensuring the accuracy of AI outputs and applying insights appropriately within farm contexts.

The findings reinforce that critical thinking must be developed alongside data analysis to ensure any recommendations based on information from AI-enabled technologies are accurate, and relevant for the individual business and the environment it is operating in. As access to information increases, the ability to evaluate and contextualise that information becomes crucial to decision quality.

Interview participants highlighted concerns about the data being used by AI-enabled technology, and whether the outputs were accurate for the New Zealand due to its unique farming systems. Weak critical thinking capability increases the risk of poor decisions and reduces confidence in both AI-enabled tools and the professionals interpreting them. This creates a risk not only to farm performance, but also to the credibility of both AI-enabled tools, and the rural professionals interpreting them.

Critical thinking also includes the ability to take the insights provided and turn them into appropriate actions. To do this effectively, rural professionals need strong relationships with farmers, alongside sound farm systems knowledge and a clear understanding of each farmer's goals. Having genuine relationships allows the rural professional to understand the problems they are facing. Without this context, AI-generated insights risk being applied too generally or without enough consideration of the individual business. Relationships therefore provide the context that allows critical thinking to be applied well. These capabilities will enable rural professionals to ask better questions of the data, challenge assumptions and translate insights into practical and relevant actions. Rural professionals must apply critical thinking to evaluate trade-offs across whole farm systems, particularly where AI-generated insights operate in silos. Improving critical thinking will not only maintain the credibility of rural professionals, but it will help improve the adoption of technology as the large majority see positive outcomes.

However, every industry is trying to keep up with the pace of technology change and increase the use of AI-enabled technology in businesses to improve productivity. Along with this, rural professionals are facing external pressure from farmers to improve their data analysis, and scale it up as more farmers adopt AI-enabled technology on farm. This creates tension as critical thinking development requires rural professionals to slow down and apply their real-life experience and knowledge to the outputs. However, there will be times of inefficiency before the efficiency of AI-enabled technology can be fully realised. This tension highlights that while AI has potential efficiency gains, the quality of decision-making remains dependent on human judgement. In this context, leadership must actively prioritise environments where questioning, validation and reflection are valued alongside productivity, ensuring that speed does not come at the expense of accuracy.

6.1.3 Adaptability

The need for adaptability was highlighted in two ways, adaptation to the on-going change as the rural professional's value is redefined, along with adaptability between dealing with farm businesses.

As the rural professional role is redefined and value is placed on the ability to interpret and translate data into actions, the need to develop new skill sets was identified. Adaptability was described by participants as the capability that underpins all others, as rural professionals need to be comfortable with ongoing change. Without adaptability, rural professionals risk losing relevance as farmer expectations and technology adoption increase. This is echoed by industry leaders who identified that the pace of change we are seeing in technology is greater than any generation before us (Roser et al., 2023). Research shows that while increasing, the use of technology is still low in the primary industry, and there is large variance in the use of AI-enabled technology (AgriTechNZ, 2022; Rachel Durie, 2025). This reinforces the need for adaptability, as rural professionals reposition their knowledge and capabilities to continue adding value as adoption increases and expectations of their role evolve.

This research, particularly interviews with farmers, emphasises the variance in use of AI-enabled technology, and the requirements they desire from the rural professionals who support their business. The low users of AI-enabled technology commented that there was still a strong need for rural professionals they work with, and the high users felt this need was diminishing and they saw themselves interacting with them less, particularly those doing transactional sales. As farmers adopt AI-enabled technology more effectively, the value of traditional transactional roles is likely to decline, reinforcing the need for rural professionals to reposition their role. This is supported by the World Economic Forum (2025) that reports there will be a job shift, rather than a job loss impact due to the uptake of AI-enabled technology.

The ability to work with a range of people and farm systems has always been a core capability of rural professionals (Duker, 2019), and it was commented by the farmers interviewed that they valued rural professionals that listened to them and their needs, and gave honest, specialised advice. This part of adaptability will continue to be important, especially as all interview participants commented that the divergence in technology uptake and capabilities is growing rapidly. To successfully manage these differences, rural professionals will need to improve adaptability, but they also need to focus on strong relationship building capabilities, to ensure that information or insights is aligned and delivered appropriately for the individual. The idea of adaptability being a key capability is supported by recent literature that suggested rural professionals need to become comfortable operating on both sides of the innovation frontier (Figure 3), and to be able to transition from providing answers, to asking questions and coaching seamlessly (Lee Matheson, 2022).

The pace of change is likely to create discomfort and resistance among some rural professionals. Industry leaders are seeing this already as some are successfully adapting ways of working and seeing productivity gains, and others are resisting change. To ensure that rural professionals are willing to change their ways of working and see value in repositioning their roles, leaders need to create clarity amongst the uncertainty and continue to explain why the change is happening and reinforce the idea that technology can be used to enhance roles, rather than replace them. Structured learning environments to enable emerging capabilities, along with a psychologically safe environment will also help leaders facilitate adaptability successfully.

6.1.4 Relationship building

The ability to build and maintain strong, meaningful relationships has always been a core capability of a successful rural professional (Duker, 2019).The research confirmed that as AI-enabled technologies increase, the human-centric skill of relationship building is going to become more important, not less. All interview participants described strong relationships built through trust and good communication, as one of the most valued capabilities of a successful rural professional. As farmers gain independent access to data and insights, the role of rural professionals shifts from information provision to trusted interpretation, grounded in credibility and understanding. Throughout this transition, participants described strong relationships as the gateway to value and will be crucial in ensure data insights are accepted and acted upon to improve farm performance. Without trust, even high-quality data and analysis may fail to influence decision-making. This aligns with previous research that suggests that human-centric or 'soft skills' are becoming increasingly important as technology adoption increases, and new jobs or roles are defined (Allen, 2024; World Economic Forum, 2025).

These relationships must extend beyond rapport to a deep understanding of business goals and individual decision-making contexts. This will allow them to work collaboratively with farmers to interpret data, challenge assumptions and apply insights in a meaningful and practical way. The uptake of AI-enabled technology in the primary sector has been described as slow and uneven (AgriTechNZ, 2022; Rachel Durie, 2025). This has been echoed in the research that shows there is a growing variance in farmers attitudes, confidence levels and willingness to adopt new technologies or its insights. This strengthens the case for strong relationships, as generalised advice will be ineffective and will result in poor outcomes. However, relationship building cannot be developed in isolation; rural professionals will need to develop strong data and critical analysis skills to ensure recommendations are accurate to maintain credibility and the overall relationship.

As relationships are the mechanism through which AI insights are interpreted and acted upon, leadership plays a crucial role in helping rural professionals sustain and strengthen these relationships. As the use of AI-enabled technologies increase there is a risk of reliance, which may reduce the development of crucial relationship building skills such as communication, trust and negotiation. If not maintained, this could impact long-term relevance of rural professionals in an AI-enabled environment. This decline has already been described by previous research in both gen-z and older generation due to the increased use of technology, and the impacts of COVID-19 (Breaux et al., 2023; Hooker, 2016; Visser & Terblanche, 2025). Due to this decline, leaders not only need to raise the importance of relationship building and lead by example, but they also need to create structured opportunities for learning to ensure relationship building remains central to rural professional development.

6.2 Leadership capabilities

The findings indicate that leadership capability is central to developing skills required for rural professionals to succeed in an increasingly AI-enabled workplace. Rather than focusing on the technical integration of AI, participants emphasised the importance of strong leadership in how individuals effectively develop their personal capabilities to work alongside AI-enabled technology. As roles shift towards data interpretation, critical thinking, adaptability and relationship-based work, leaders are required to actively enable the development of these skills.

One of the most important leadership capabilities identified was the ability to help individuals redefine their value as roles evolve. In the context of the protection motivation theory, this transition can be understood as the response to a perceived threat, where individuals recognise the need to adapt to remain relevant (Marikyan, 2023). This can lead to two responses: proactive skill development or disengagement. This outcome will be influenced by their ability to develop these skills and the level of support available to them.

Rural professionals interviewed commented that while they didn't need their leadership teams to know all the answers, they did need them to create clarity within the ambiguity. Without this clarity, individuals are more likely to disengage from capability development, leading to a wider performance and adoption gap. The importance of human-capabilities, particularly relationship building, has been repeated throughout the research and literature (Kumar, 2023). Industry leaders stressed the importance of ensuring rural professionals know that people, and their capabilities, are increasingly important, and for rural professionals this means their work will be enhanced, rather than replaced. Encouraging this, and making time for professional development, will ensure rural professionals see the AI-enabled technology as a low perceived threat, to ensure they do not disengage from their personal skill development (Marikyan, 2023). This is supported by literature that states as jobs are loss due to AI-enabled technology, new jobs will also be created, resulting in a net growth of 7% of total employment, or 78 million jobs globally by 2030 (World Economic Forum, 2025). This encourages the view held by research participants that there will be a job shift, rather than a job loss, and strengths the argument for new skill development.

Leadership plays a critical role in strengthening coping responses by providing clarity, structure, and support for learning. Participants highlighted without guidance, the pace of change can feel overwhelming, and have the potential for rural professionals to disengage with skill development or new ways of working. Leaders must prioritise skill development while creating psychologically safe environments where individuals can experiment, learn, and make mistakes. The research showed there was a large variance in familiarity with AI-enabled tools, which increases the need for psychological safety, as individuals will be learning at a different pace to their peers, and these capability levels may not reflect the traditional levels of experience of hierarchy within teams.

Research participants identified workshops and the use of examples or case studies as their preferred options for the development of new skill sets. Industry leaders stressed the importance of bringing in experts to facilitate or showcase new skills, particularly related to AI-enabled technology. They commented that these skills may not be their personal strengths, so bringing in experts enables better development, but also encourages psychological safety within teams and shows no one needs to have all the answers during this ongoing transition period. Industry leaders demonstrating how they balance professional growth with their workload, will also help to create a safe space, that encourages development of new skill sets.

Furthermore, leadership is required to maintain strong relational and ethical foundations, this will ensure that as technical capability increases, human skills required to build strong relationships remain central. Going forward, leaders not only need to respond to changing skill requirements as AI-enabled technology uptake increases in the primary sector, but they

need to shape whether individuals feel capable and motivated to develop those skills, determining the outcome of the transition.

6.3 Summary

Overall, the findings indicate the growing use of the AI-enabled technology in the primary sector, is driving a shift in the skill set required of rural professionals to continue to add value on farm. There will be a greater emphasis placed on data analysis, critical thinking, adaptability and relationship-building. These skills reflect a move away from transactional based tasks to an interpretation-based role, helping farmers make sense of the increased data available to them, and enable insights to be used to create actions. However, this change will not be automatic, it will require leaders within the industry and companies, to create the right environment and provide the correct support to facilitate this change. Together, these findings indicate that success in the future will rely on leadership capability, as much as individual skill development, reinforcing the need for a deliberate and coordinated approach to capability development of rural professionals in the New Zealand primary sector.

7 Conclusion

The research set out to understand how the use of AI-enabled technology is impacting the skill sets required of rural professionals to continue to add value to the primary sector, and what leadership capabilities are required to facilitate this change.

The increasing use of AI-enabled technologies is not only introducing new tools to the primary industry, but also fundamentally changing the skill set required of rural professionals to continue to add value. The role of rural professionals is shifting from a knowledge transfer role, to one of an interpreter and facilitator, with strong human centred capabilities.

The four capabilities identified to be essential of rural professionals in an AI-enabled environment are: data analysis, critical thinking, adaptability and relationship building. However, these capabilities represent more than a shift in skill development. Together, they reflect a shift toward a more complex and changing role, where value is created by the ability to translate data into meaningful insights, grounded in context and practicality to enable effective decision-making.

The research highlighted that leadership within the industry will play a large role in the development of capabilities, and transition of rural professionals. Leaders will be defined less on technical expertise, and more on their ability to lead through uncertainty, foster a safe learning environment and support individuals through ongoing change. Without this, there is a risk of disengagement with development, resulting in capability gaps, which may cause a loss of relevance for rural professionals and less effective decision making in the primary sector.

Ultimately, the increased productivity and value from AI-enabled tools in the primary sector, depends not only on the technology itself, but the sectors' ability to develop rural professionals' skills to apply it effectively. Rural professionals who combine data analysis with critical thinking, adaptability, and genuine relationships will be best positioned to continue to add value, those who cannot risk losing relevance in an increasingly AI-enabled environment.

8 Recommendations

The research concludes that the uptake of AI-enabled technology in the New Zealand primary sector is fundamentally changing the skills required for rural professionals to be successful, and that deliberate and considered leadership is required to facilitate this change.

Redefine the value of rural professionals

Industry bodies and organisations should actively redefine and communicate the role of rural professionals as interpreters, facilitators and strategic advisors. The findings indicate a shift away from traditional knowledge transfer towards generation of insights and decision support. Without repositioning, rural professionals will not see the need, or a clear pathway to change.

Examples:
- Communicate evolving expectations externally and internally
- Highlight examples of value created through data interpretation

Create a psychologically safe learning environment

Leaders should actively create and foster environments that support experimentation, continuous learning and skill development, without fear of failure. Rural professionals feel under supported during this period of rapid change, creating a risk of disengagement. Psychological safety is critical to enable individuals to develop new capabilities and adapt their roles.

Examples:
- Encourage the use of new technologies
- Normalise uncertainty and ongoing learning through leadership behaviour
- Reduce or reposition performance pressure during early adoption to allow for learning

Develop technical capabilities: data analysis and critical thinking

Organisations should implement structured, practical training programmes focusing on data analysis and interpretation, alongside critical thinking. The findings showed that increased access to data is not improving decision making and is causing overwhelm for farmers and rural professionals. This indicates a capability gap that should be addressed, using external or internal expertise.

Examples:
- Case-based workshops using real data
- Training on asking effective questions of the data
- Training on identifying bias and validating outputs

Improve and highlight the importance of human-centred capabilities: relationship building and adaptability

Organisations should continue to invest in and encourage the development of relationship building and adaptability. As access to information increases, relationships are the mechanism to turn data insights into action, and improved performance. Adaptability is required to continue to service a range of farmers, in an environment of ongoing change.

Examples:
- Training in communication and relationship building
- Embedding relationship focused performance measures

- Segment customers based on technology use and capabilities, with different planned approaches.

9 Limitations

Due to the size of this project, a conscious decision was made to focus on the impact on skills for rural professionals in the industry, rather than the adoption rates and types of technology.

This study focused on the entire primary sector of New Zealand. However, many of the survey participants were from the dairy industry. This may have resulted in bias due to large data sets available due to wearable technology, and result in the research being less applicable to other sectors within the primary industry.

There was an effort to select interview participants with a range of experience and knowledge around AI-enabled technology. While this ensures a diverse range of views were considered, it may influence the groups attitude towards technology, and it's use in the primary sector. There are also limitations due to the sample size of participants, and in future a wider study could be completed.

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11 Appendix

11.1 Interview Questions

Farmer questions

1. Can you tell me about your business and what technology you use, particularly focusing on any AI-enabled tools?
2. Do you see AI-enabled technology playing a bigger role on your farm in the future?
3. What are your major barriers to adopting more AI-enabled technology on farm?
4. Do you feel like you are maximising the information and data you receive for your farm?
5. In your experience, what are the usual reasons you contact rural professionals you work with?
6. What skills do you value in rural professionals who support your business well?
7. AI provides data, insights, and rapid availability of information. With that in mind, what skills do you see becoming more important for RPs you successfully help you with your business?
8. Do you see a future where some RP roles you interact with may be less common or not required?

Rural professional questions

1. Can you tell me about your journey through the RP sector, highlighting how your role has changed over time?
2. From your experience, what skills and capabilities make a RP successful?
3. How are the farmers you are currently working with engaging with technology, and what patterns or differences have you seen between clients?
4. In your opinion, what are the main factors influencing farmers willingness or reluctance to adopt technology?
5. Over the past 3 years, what types of service requests have you most frequently received from farmers, and how have these changed over time?
6. Looking ahead 5 years, how do you feel farmer needs are changing as they gain access to more data, technology and rapid knowledge?
7. What skills do you think will be crucial to be successful as a RP in the future too continue to add value on farm?
8. How do you feel about developing new skill sets to facilitate this change, what kind of support are you receiving or want from your organisation or manager?
9. What barriers or challenges do you personally have in adapting to these changes?

Industry leader questions

1. How do you see AI-enabled technology shaping your organisation's role in the industry in the next 5-10 years, both internally and externally?
2. How do you think AI will change the advisory relationship between rural professionals and farmers?
3. What opportunities or concerns do you have with the increase of AI-enabled technology in your business or our farmers businesses?
4. Can you describe any changes to the skill sets required of RPs in the future to stay relevant to farmer's needs?
5. How are you currently supporting, or plan on supporting, your employees to develop these emerging skills?
6. Thinking of your employees, what barriers to change to you anticipate over the changing skill set required by an AI-enabled workplace and on-farm environment?

7. What leadership behaviours, skills, or capabilities will be most important to you over the next 5 years to create a safe and supportive learning environment for your team?

11.2 Survey Questions

Impact of AI-enabled tools on rural professionals in the NZ Primary Sector - Kellogg Research

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Start of Block: Consent

Q1 I would like to invite you to participate in a project entitled The AI Shift: Evolving Skills and Leadership in New Zealand's Primary Sector. The aim of the project is to understand how the use of artificial intelligence (AI) in New Zealand's primary sector is changing the skillset required of rural professionals, and what leadership capabilities will be essential for supporting them through this transition. If people want to be part of the project, they need to be involved in the New Zealand Primary Sector and be over the age of 18. Participation in this study requires the completion of a survey that will take 10 minutes. You are not required to participate. Participation in this study is completely voluntary, and you have the right to opt not to complete or submit the survey. The results of the project will be published on the Kellogg Rural Leaders website and may be published in an academic journal or presented at a conference. However, the survey is completely anonymous. To ensure confidentiality, your data will only be seen by me and will be stored in an electronic form with password protection. Only aggregated data will be presented in any publications. This study has been reviewed and approved by the Lincoln University Human Ethics Committee (HEC2026-10). If you have any questions about participating in the project, please contact me or my Course Examiner; we would be happy to discuss any concerns you have. Thank you for agreeing to participate in this project! Do you wish to continue?

- ○ Yes (1)
- ○ No (2)

End of Block: Consent

Start of Block: Demographics

Q2 Which best describes you? (select all that apply)

- ☐ Rural Professional (e.g agri-banking, consultant, tech provider, vet etc) (1)
- ☐ Farmer (2)
- ☐ Other (Please specify) (3) _____

Q3 Primary sector type? (select all that apply)

- ☐ Dairy (1)
- ☐ Sheep & Beef (2)
- ☐ Horticulture (3)
- ☐ Arable (4)
- ☐ Forestry (5)
- ☐ Other (6) _____

Q4 How long have you worked in the sector? (select one)

- ○ 0-5 years (1)
- ○ 6-10 years (2)
- ○ 11-20 years (3)
- ○ 20+ years (4)

End of Block: Demographics

Start of Block: Current level of engagement with technology?

Q5 How confident are you using digital tools or technology in your work?

	Not confident (1)	Slightly confident (2)	Moderately confident (3)	Very confident (4)	Extremely confident (5)
Confidence Level (1)	○	○	○	○	○

Q6 How familiar are you with AI-Enabled tools? (Automated insights, prediction tools, analytics, chat-based support)

	Not familiar at all (1)	Slightly familiar (2)	Moderately familiar (3)	Very familiar (4)	Extremely familiar (5)
Familiarity with AI-enabled tools (1)	○	○	○	○	○

Q7 How often do you currently use AI-enabled tools? (select one)

- ○ Daily (4)
- ○ Weekly (5)
- ○ Monthly (6)
- ○ Rarely (7)
- ○ Never (8)

End of Block: Current level of engagement with technology?

Start of Block: Future state of technology in the primary sector

Q8 What impact do you think AI-enabled tools will have on the primary sector in the next 5-10 years?

	No impact (1)	Slight impact (2)	Moderate impact (3)	Large impact (4)	Significant impact (5)
Level of impact (1)	○	○	○	○	○

Q9 What do you see as the biggest opportunity for AI in your work or business?

_____

_____

_____

_____

_____

Q10 What concerns, if any, do you have about the increasing use of AI in the primary sector?

_____

_____

_____

_____

_____

End of Block: Future state of technology in the primary sector

Start of Block: Block 4

Q11 To what extent do you believe the skill set of rural professionals will need to change due to AI-enabled technology?

	No change (1)	Slight change (2)	Moderate change (3)	Large change (4)	Significant change (5)
Level of change (1)	○	○	○	○	○

*

Q12 What skills do you think will become important? (select up to 3 or comment any other skills you think will be important)

- ☐ Data analysis (1)
- ☐ Digital tool proficiency (2)
- ☐ Communication & relationship building (3)
- ☐ Adaptability (4)
- ☐ Critical thinking (5)
- ☐ Business/Financial Knowledge (6)
- ☐ Collaboration (7)
- ☐ Other (8) _____

End of Block: Block 4

Start of Block: Leadership & Support Change

Q13 How well supported do you feel by industry leaders or organisations through digital/AI changes?

	Not well at all (1)	Slightly well (2)	Moderately well (3)	Very well (4)	Extremely well (5)
Level of support (1)	○	○	○	○	○

Q14 What support would be most useful to help you transition to using more AI-enabled tools? (select up to 3)

- ☐ Training (1)
- ☐ Workshops (2)
- ☐ One-on-one training (3)
- ☐ Clear guidelines for responsible use (4)
- ☐ Examples or case studies (5)
- ☐ Access to digital advisors (6)
- ☐ Other (7) _____

Q15 In your view, what leadership behaviors or actions will be most important to support people through AI-driven change?

_____

_____

_____

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_____

Q16 Is there anything else you would like to share about AI and the future of the primary sector?

_____

_____

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_____

_____

End of Block: Leadership & Support Change