5 June 2019

The New Zealand Productivity Commission

By email: www.productivity.govt.nz/make-a-submission

Public consultation on: Technological change and the future of work

DairyNZ welcomes the release of the issues paper *Technological change and the future of work* and the opportunity to submit on the impact of technology and innovation on the dairy sector.

DairyNZ is submitting on behalf of the dairy farm production sector as the peak industry body, mandated by farmer vote, and welcomes any opportunity to discuss this submission in further detail with the Productivity Commission.

This submission:

- introduces DairyNZ's role, commitment to building great workplaces and its future focused work
- considers the current and future focus of technology on New Zealand dairy farms in terms of productivity, education of dairy workers, and impact on the labour market
- considers ways in which the Government could help those in the dairy industry benefit from advances in technology and innovation

The dairy industry's contribution

The dairy sector accounts for 7.8 billion (3.5%) of New Zealand's total GDP. This is shared between dairy farming ($5.96 billion) and dairy processing ($1.88 billion). The industry is an important contributor to supporting ongoing regional growth and employs over 40,000 people, with 27,000 people on farms, and a further 13,000 people engaged in dairy processing. The dairy sector's contribution to national employment has grown steadily over time, and for the last 15 years has grown on average by 3.7% per year, twice as fast as the 1.7% recorded for total employment.

DairyNZ's role

DairyNZ is the peak industry organisation representing New Zealand's dairy farmers. Our purpose is to deliver a better future for New Zealand dairy farmers. We are mandated to support this purpose through a farmer vote to levy milk solids production.

Our work, which is funded by the levy and government investment, includes:

- research and development to support adaptive on-farm management

- leading the adoption of best practice farming through investment in extension networks and formal and non-formal training
- promoting careers in dairying
- advocating for farmers with central and regional government
- building a dairy sector workforce

DairyNZ's commitment

DairyNZ itself invests approximately $7.5m annually into attracting, growing and retaining people predominantly delivered under large programmes of work. For example: *'The Future of Work'* programme contains projects from labour efficiency to health, safety and wellbeing and includes leadership and new initiatives to attract people into dairy including designing what an innovative workplace could look like in 2030.

Additionally, DairyNZ has an emphasis on ensuring that dairy farmers provide a high quality work environment for their staff through the implementation of good workplace management practices outlined in the *Workplace Action Plan*: www.dairynz.co.nz/people/sustainable-dairying-workplace-action-plan We see a high-quality work environment as a critical step in achieving the broader social, economic, and environmental objectives outlined in the *Dairy Tomorrow* Strategy: www.dairytomorrow.co.nz

DairyNZ is committed to building great workplaces for New Zealand's most talented workforce as set out in *Dairy Tomorrow*. This commitment reflects the capability challenges faced by the sector in transitioning to a sustainable future. It is ambitious, and holds significant value for employers, employees and New Zealand if achieved.

Achieving this commitment requires a well-coordinated and high performing research, development, extension, and education system that considers workforce requirements across the sector, including:

- a definition of competencies required across the workforce
- provision of appropriate learning opportunities to meet the needs of the sector
- attracting talent to the sector from school or other workplaces
- supporting transition into the sector
- enabling life-long learning
- appropriate recognition methods, suited to the sector
- improving data connectivity so that farmers need for valid data can be met by authorised data exchange between organisations.

Technology on today's dairy farms and the impact on the workforce

Dairy farmers have been adopting automation technologies to make the job easier, more productive, and to reduce labour in aspects such as milking (Fig. 1 below). In rotary dairy sheds the use of automation technologies has been most significant, with 77% of farms with rotary dairies using automated technology which can reduce the number of people required at milking time.

Fully automated milking represents a large opportunity for farmers, but currently adoption is low (about 25 farms in total) due to factors such as cost of technology and poor fit with large pasture-based dairy farming. Significant private and public research and development money has been spent in New Zealand and Australia attempting to adapt automated milking from its success in Europe, to our pasture-based systems. We expect milking will be more automated in the future, this may still take several decades to be commonplace in NZ. The extent to which fully automated systems will become common place will depend on the adaptability of the technology to pastoral systems and economic considerations. The implications of milking automation for the future of dairy farm work include freeing farm workers from current early starts and long days due to the milking routines. Farm labour will likely then be spread to other jobs, and there may be some reduction in overall labour per farm. However, studies in Europe have shown that use of automated milking did not dramatically reduce overall labour hours on farm, rather the hours were redistributed to other tasks.

Increasing use of technology such as blockchain platforms (in which consumers can trace goods back to the point of origin) can transform the relationship between farmer, processor and consumer. That development will impact on farm decision making processes including the need for farmers to develop specific skills to realise the full potential of the technology.

The increased use of data from farming technologies presents an opportunity for farmers to better understand their farm systems and therefore improve outcomes for productivity and sustainability. The use of data-gathering sensors is still relatively low on NZ dairy farms (Fig 2 below), mostly due to lack of a clear value proposition for farmers, along with other issues such as inter-technology compatibility, an immature support sector, issues with data exchange, and reliability within New Zealand farm systems. We expect the use of sensors and intelligent decision support tools to rise in coming decades, to help manage farming complexity and to provide proof of practice in value chains. The implications of more sensors and data collection for the future of work include the use of decision support tools to replace or augment some jobs, such as irrigation management and pasture/grazing management. This may allow farmers to employ a wider range of people, with less need for pre-existing farming experience. Also, dairy farming will be a more innovative sector, attractive to people wanting a mix of tasks involving analytical decision making while spending more time outdoors and in contact with animals.

Dairying consists of farmer owners, farm staff and a wide network of stakeholders off-farm. The increased role of technology also has implications across these parties. For example, DairyNZ has observed increases in digitalisation of farm advisory roles, and there are implications for the changing nature of the farmer-advisor relationship due to technological change. Also, the greater use of technology in farm systems offers opportunities and challenges for farmer-animal interactions, and farmer-consumer interactions and this needs to be carefully considered as we move toward a technological farming future. The use of frameworks such as Responsible Research and Innovation (which represents the connection between research, innovation and society), as widely adopted in the EU will help guide dairy farmers address issues around technology and the future of work.

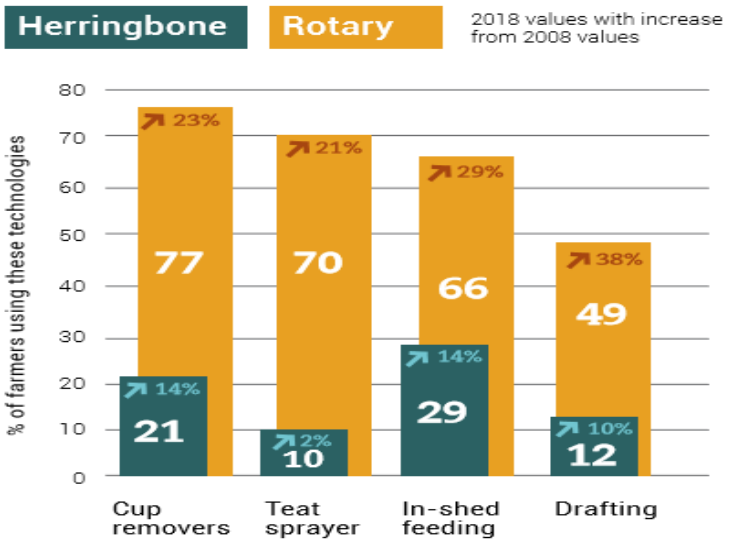

Figure 1: Change in adoption of dairy automation technologies from 2008 to 2018

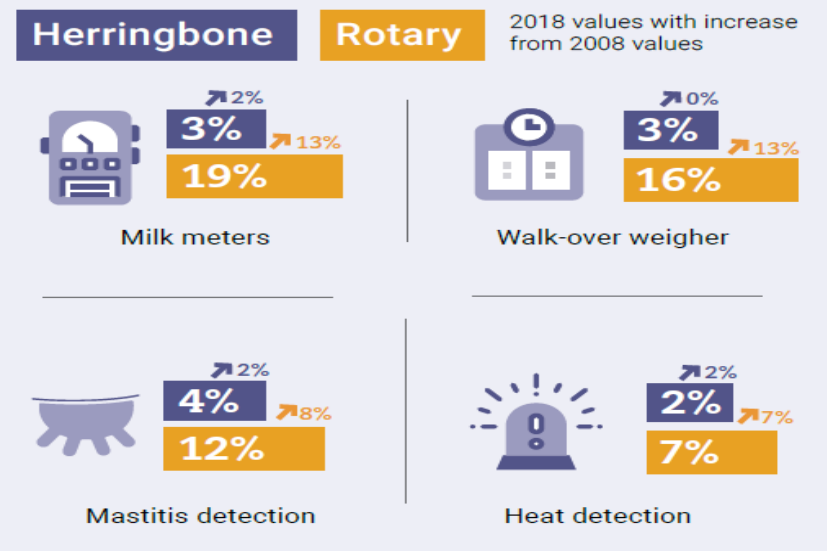

Figure 2: Change in adoption of data-capture technologies from 2008 to 2018[1]

The adoption of new technologies, and further optimisation of cows, grass and farm systems (through robotics) will be needed to achieve necessary productivity and efficiency gains on farms. Information technology, data and analytics help support the industry's response to customer information and consumer needs.

[1] Dela Rue, BT, Eastwood, CR, Edwards, JP, Cuthbert, S (2019) *New Zealand dairy farmers preference investments in automation technology over decision-support technology*. Animal Production Science, Online Early

Innovation and technology can empower the dairy industry, increase production and generate economic growth, but does require a different more specialised skill base through the industry.

DairyNZ recognises that investing in research and development, being adaptable to change, building people capability and adopting new technology are priority areas for the sector.

DairyNZ's focus on technology and new ways of working

For the last two years, DairyNZ has been working with the dairy industry on a project focussed on new workplace design. This has involved working with farmers and other stakeholders to understand future workplace trends (such as advances in technology) and starting to design workplaces that can meet any upcoming challenges.

The wider use of technology in dairying has a range of implications. In the DairyNZ led project *New Workplace Design*, three 'Dairy Work Worlds of 2030' were explored with a group of farmers from throughout NZ. The scenarios (below) will be used further over the next year to understand implications for people, and for farm systems, of differing futures.

- Dairy work world 1: Increases in technology that require people to upskill which changes the attractiveness of dairy.
- Dairy work world 2: The workforce becomes more multicultural due to demographic change and easier movement across borders for skilled people
- Dairy work world 3: How people learn has completely changed with point-in-time and targeted learning

As the project has progressed several dairy workplace challenges have been identified. These centre around recruitment processes, skills and learning, farm and industry structural issues, and the impact of farm profitability on the ability to implement new people practices. As a result, some specific priorities have been identified as a focus for future dairy workplaces, these include, but are not limited to:

- leveraging new ways of connecting and communicating to create engaged and effective teams;
- defining the opportunity for technology to make the job easier and more enjoyable;
- developing farm systems that are safe, innovative, and provide a good career path

Over the next year, the project group will build on prototype ideas and will utilise information on international and domestic trends; industries and organisations that are leading workplace practices, and people management expertise to create the best solutions for the future workplace.

DairyNZ is committed to working with dairy farmers by helping inspire them to create future focussed, technologically advanced farms that are not only more productive, but make fundamental changes to the way labour is utilised and therefore have a positive impact on the wellbeing of all farm owners and workers.

Barriers to change

In modern dairy farming manual labour features just as much as technology and many New Zealand dairy farmers are responding to challenges in productivity by employing more low skilled workers as opposed to looking at re-engineering production methods. However, as Grant Robertson stated in 2018: '*more total hours worked and an increase in the volume of labour input does increase production but is not a recipe for long term sustainable and inclusive growth*[2].

Farmers have indicated that they want to know what 'good' looks like, they want to have more accurate and usable data to help them and they want to access to levers that they can use in the whole biological system of the farm. Better education, more information around the benefits of technology and even a repositioning of the way dairy farming is represented for potential employees would help. For some dairy farmers, this may represent a cultural shift in well-established practices but taking up the challenge and adopting a new way of working would represent firm productivity and wellbeing gains for both farmers and workers.

Specifically, the uptake in technology has not been higher due to a variety of factors including:

- financial barriers and an unclear value proposition for farmers who have constant demands for capital investments
- concern that technology will not work effectively within complex biological farming systems or will be complex to use
- a lack of data interoperability related to different technology interfaces, different data standards/definitions, closed formats because of IP restrictions (The NZ Farm Data Standards initiative is looking to address this issue, but more work is required).
- technical issues related to the reliability and accuracy of devices, which can lead to disenchantment about technological options
- rural environments that present unique technological challenges such as farm isolation, weather and topography
- the growing Government focus on environmental issues such as climate change, biodiversity and water; while recognised as important, can represent constraints on milk production, higher compliance costs and, in some cases, less of a farmer focus on research and technology

Overall farmers recognise the importance of research and development and the potential for technology to identify solutions that support sustainable dairy farming specific to local circumstances.

Investing in the future: what the Government can do

DairyNZ recently submitted on the Reform of Vocational Education proposal (RoVE). We submitted that there is an opportunity to grow participation in learning, via industry leaders, and to transition dairy farms to a new level of performance. The education system needs to incorporate ongoing professional development, integrate with research and development and innovation to meet the

[2] Grant Robertson: *The Future of Work,* speech to the Productivity Hub, 13 February 2018

needs of lifelong learners and in turn influence the labour market. It will doubtless also require a greater focus on STEM subjects (science, technology, engineering and mathematics).

In March this year, DairyNZ also provided a submission to Immigration New Zealand in response to its consultation document *'A new approach to employer-led assisted work visas and regional workforce planning*.' Currently, the dairy industry relies heavily on migrant labour to fill vacancies caused by the growth of the sector over the last decade. Technological change does signal a shift in the skill level needed on our dairy farms. Any future immigration policy considerations will need to take account of that technological change and provide an integrated government response across education, skills and workforce planning.

Government support of innovation and technology will assist the dairy industry to effectively upskill its workforce in order to lift dairy productivity (to a higher level of labour productivity based on OECD standards), this in turn will have a positive impact on not only dairy farmers and workers, but will have a positive ripple effect out into the regions. This kind of investment contributes heavily to the performance of the sector and should be viewed by Government as a core contribution to learning by industry.

While rural broadband/cellular rollout is helping increase connectivity on farms, there is more Government thought and input required around:

- the need for farmers and employees to retrain or upskill, with a greater focus on bringing innovative methods for training to our vocational training programmes and secondary schools
- initiatives to help understand how technology can connect agriculture with the increased proportion of Maori, Pacific Islander, and Asian in New Zealand's future population
- assessments of the employment law implications of greater 'gig economy' adoption, as increased digitalisation will open opportunities to employ more people for gig-style jobs (such as short-term contracts) on farm
- improvements to rural broadband/5G coverage to ensure our farms can be as open and competitive as possible, and assistance for farmers to make better use of technology
- work to understand how consumers view the use of data, automation and artificial intelligence in their food chain
- leadership and strategy that fosters the building of capability to design and use data, technology, and analytics. There is a need to link with different sectors (inside and outside of agriculture) and internationally.
- increasing investment in skills and training. In the dairy sector, demand is strong for roles in the lower-mid skilled range. That workforce supply restriction has impacted on both economic and social outcomes (including individual and community wellbeing)
- increasing fiscal support for farm research around technology that has a greater focus on the impact of technology and innovation on work

We would like to see the Government continue to actively engage with the dairy industry and dairy leaders around the future of farming education with a specific focus on building the capability of sector players to use data, technology and analytics.

Conclusion

DairyNZ will continue to take a forward focussed perspective to help design great dairy workplaces of the future. While we believe that boosting productivity through technology across the whole economy, will improve New Zealanders' standard of living and wellbeing, we also are conscious of not looking at productivity in insolation. Dairy farming is more than growth in GDP or economic gain to the country, it is about well-functioning farms with owners and workers that enjoy their work and feel part of a community. Technology ultimately helps farmers utilise modern systems and tools that will not only increase productivity but can represent a more attractive lifestyle change for workers, with a gradual shift away from more manual tasks, fewer hours worked and a shift of focus on the farm.

Thank you for the opportunity to contribute to this inquiry. Please contact Katy Cook on: 021 036 88 12 or Katy.Cook@dairynz.co.nz if you have any questions regarding this submission. We look forward to the release of draft reports later in the year and would welcome another opportunity to provide a further submission to you at that time.

Yours sincerely

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