Performance across 60 Years of the Dairy Economic Survey

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Highlights

For the last 60 years DairyNZ and its predecessors (the New Zealand Dairy Board and Dexcel) have been publishing the Economic Survey under various names. These publications summarise the financial performance of New Zealand dairy farms for each financial year (season). By combining the results of each publication, we create a dataset that describes the financial position and performance of the average New Zealand dairy farm including the following observations:

- The intensification and expansion of the sector
- A negative trend in the percentage total return on assets
- Fluctuations in the debt to asset ratio of dairy farms
- Dairy farmers are spending more on feed in real terms.

Keywords: dairy farming, economic survey, financial performance, financial position

Background

Each iteration of the Economic Survey describes the financial performance of the average New Zealand dairy farm in a given financial year (season), these results can be combined to examine how the average farm has evolved over the 60 publications in the series.

This article will describe the evolution of the survey and the sector over the course of 60 years, describe how comparisons were made, offer descriptions and drivers of key changes of the sector over the period and conclude by summarising the evolution of the sector and the key threads.

The DairyNZ published Economic Survey is predated by the Economic Survey of Factory Supply Dairy Farmers which was first published for the 1963-64 season by the New Zealand Dairy Board. From the 1988-89 season onwards, the annual survey was prepared by the Livestock Improvement Corporation (LIC) until Dexcel (the predecessor of DairyNZ) took over the publication for the 1999-00 iteration and changed the name to the Economic Survey of New Zealand Dairy Farmers. The most recent change occurred in 2005-06 which saw Dexcel transition to DairyNZ and the publication be renamed the DairyNZ Economic Survey, as it is known today.

Over the years, the content of the publication has evolved, with various financial measures being added or removed, along with changes in sample size. Despite these changes, at its core, the survey has consistently described the national average profitability and returns generated by dairying in New Zealand and been used widely by farmers, researchers and policy makers.

1960-1980

The industry underwent major structural changes during these decades, with 229 dairy factories operating by 1969 and the opening of the world's largest dairy factory in Hāwera by 1973 (DairyNZ 2014). The New Zealand Dairy Board was the body responsible for exporting all New Zealand dairy products, playing a crucial role in the industry's development (Akoorie and Scott-Kennel 1999). By 1970, Britain accounted for over 90% of New Zealand's butter exports and 75% of its cheese exports (Nixon and Yeabsley 2010). A major shift occurred in 1973 when the UK joined the European Economic Community, displacing New Zealand's dairy exports. This prompted the dairy industry to diversify both its export markets and range of dairy products. In response, Supplementary Minimum Price Schemes were introduced to guarantee farm incomes (Griffith and Grundy 1988).

Meanwhile, industry practices evolved with the widespread adoption of bulk milk collection via tankers, replacing the traditional method of collecting skimmed cream in cans (DairyNZ 2014). Farmers increasingly favoured volume over fat content, leading to a decline in Jersey cattle numbers in favour of Crossbreed cattle (LIC 2004). Technological advancements also shaped the industry. The introduction of rotary dairy platforms revolutionised milking efficiency (Stringleman and Scrimgeour 2008), and innovations such as electric fencing and plant wash detergents improved farm operations (DairyNZ 2014). Feed systems evolved with the use of silage pits, maize, and green-feed silage (DairyNZ 2014), while the use of nitrogen fertilisers became more common to boost pasture growth and significant improvements were seen in the treatment of milk fever and mastitis (DairyNZ 2014), accompanied by LIC's establishment of its Somatic Cell Count service (LIC 2025).

1980-2000

The 1980s and 1990s were also a period of significant change for New Zealand's dairy industry. In 1984, the removal of agricultural subsidies forced farmers to operate in a more market-driven environment (Gouin

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2006). High inflation, peaking at 19% in 1987 (New Zealand Herald 2017), added to economic pressures. Despite these challenges, the industry saw rapid technological and structural changes, including increased mechanisation, advancements in embryo technology, the adoption of indoor calf rearing, and the establishment of the National Dairy Herd Database and MINDA, a herd management system (DairyNZ 2014, LIC 2025), reflecting evolving market demands. Environmental regulations also took shape with the introduction of the Resource Management Act (RMA) in 1991, setting the foundation for future sustainability efforts.

The 1990s saw rapid expansion into the South Island, with its share of the national herd growing from 7% to 20% (LIC 1999). Research and innovation played a key role, with the formation of the Dairy Research Corporation and AgResearch in the early 1990s (Galbreath 2008). Meanwhile, industry consolidation accelerated, from 35 dairy companies in 1982 to only eight by 1998 (DairyNZ 2014). In 1996, the Breeding Worth (BW) index was introduced for the selection of sires and cows, replacing the Breeding Index (BI) introduced in 1974 (LIC 2025). The payout system shifted from being based on fat content to milksolids (LIC 1999).

2000-2023

The 2000s was a period of transformation for the New Zealand dairy industry, driven by the deregulation of dairy exports and structural changes. The Dairy Industry Restructuring Act (DIRA) of 2001 enabled the merger of the New Zealand Dairy Board and the two largest dairy processors (New Zealand Dairy Group and Kiwi Co-operative Dairies) to form Fonterra, to enhance the global competitiveness of New Zealand's dairy sector (MPI 2024). Industry support organisations evolved in the early 2000s, with Dexcel and Dairy Insight emerging to provide research and extension services for dairy farmers, later merging into DairyNZ in 2007. The sector also refined its strategy to emphasise both competitiveness and environmental responsibility. Key initiatives included the introduction of the milksolids levy in 2003 (NZL 2003), the creation of DairyBase in 2006 to improve farm performance through benchmarking, and the Dairy and Clean Streams Accord (MAF 2011). By the late 2000s, the average farm had expanded significantly compared to the 1990s, growing from 164 cows on 70 hectares (2.3 cows/ha) to 376 cows on 134 hectares (2.8 cows/ha), reflecting the intensification of the industry (DairyNZ and LIC 2024).

Global market opportunities expanded, particularly following the Free Trade Agreement with China in 2008, which significantly increased dairy export volumes to China and Southeast Asia (NZG 2008). By 2007, three major dairy co-operatives were operating: Fonterra, Westland and Tatua (Nilsson and Ohlsson 2007). During this decade, Fonterra built the world's largest milk drier in Edendale. The sector celebrated key milestones, with Westland Milk Products turning 75 years in 2012 and Tatua reaching its 100th anniversary in 2014. However, the industry's rapid growth also raised environmental and regulatory concerns. Land-use change restrictions, freshwater regulations (such as the Resource Management Act and the 2020 National Environmental Standards for Freshwater), and greenhouse gas (GHG) policies became focal points during the 2010s. Debates over split-gas approaches, emissions intensity versus net reductions, and the now-cancelled He Waka Eke Noa (HWEN) programme highlighted ongoing uncertainty in emissions management.

Other challenges emerged, including water use regulations, limitations on irrigation access, and the phasing out of border dyke irrigation, which required significant capital investments for farms with water rights. The COVID-19 pandemic further disrupted the industry, exacerbating labour shortages and highlighting reliance on immigrant workers. Despite these challenges, New Zealand's dairy sector remained a global leader, marking 200 years of dairy farming alongside record export revenues. Still, the need to balance economic growth with environmental responsibility and regulatory compliance remains a defining factor for the industry's future.

Our Approach

Since the Economic Survey is prepared on a season-by-season basis to compare financial performance over the past 60 years, it's essential to understand how the average dairy farm has changed physically over time. Equally important is adjusting values to enable meaningful comparisons across decades. This section outlines the approach used to capture these changes and apply the necessary transformations before they are demonstrated via table and graphs in the following section.

Physical decade analysis

To determine the average physical and financial characteristics for each decade the data was grouped into seven decades, from 1963 to 2024 and the mean for each group was estimated. As a result of the data not fitting exactly into six decades, the groups for the first decade contained seven observations while the last decade contained three.

Visualisations

Plots were created using ggplot2 (Wickham 2016) and

Table 1 Physical characteristics of the average New Zealand dairy farm by decade

	1960s	1970s	1980s	1990s	2000s	2010s	2020s
Maximum Cows Milked	92	117	136	190	309	410	411
Effective Area (Ha)	59	69	65	79	114	144	143
Production (kg milksolids)	21,086	27,870	36,169	55,201	103,530	155,399	171,514
Milksolids per cow	237	238	266	290	335	379	417

where trendlines were used they were determined by a LOESS model.

Inflation adjustment

The values reported in each iteration of the economic survey are nominal (unadjusted) values, while ratios and percentages are comparable over time any numeric values would not be given the inflation. Therefore, values were deflated to their real value using the Consumer Price Index (CPI) (Stats NZ 2025). While deflating to estimate the real value attempts to remove the impacts of inflation we note that farm inflation (more specifically dairy farm inflation), measured using the Producer Price Index (PPI) is greater than the CPI (Stats NZ 2025). However, the dairy PPI could not be used in this instance as it does not go as far back as the study period. This means we cannot say that all inflation impacts have been removed during the deflation process.

Indices

Indices were used to analyse the relative evolution of various physical and financial metrics. The indices were calculated by dividing the value of the variable of interest by the first observation of the variable.

Proportions

Expenses were aggregated such that animal health and breeding and herd improvement became animal health and breeding, farm dairy expenses and electricity became shed, weed and pest and pasture and supplements became pasture and supplements, and freight and other became other. The proportions of the aggregated nominal total dairy cash expenses were then calculated for each season.

Results and Discussion

Physical Characteristics

Over the 60 years examined, both the physical characteristics and economic performance of the average dairy farm have evolved through challenges, opportunities and incentives. The physical characteristics transformed materially as the sector transitioned from smaller and simpler businesses to larger and relatively more complex businesses. This is reflected in the growth in the size of the average farm from 92 cows on 59 hectares (1.6 cows/ha) in the 60s, to 190 cows on 79 hectares (2.4 cows/ha) in the 90s, then, following a period of intensification during the 90s and early 2000s, to 410 cows on 144 hectares (2.9 cows/ha) (Table 1).

The significant increase in average herd size can be partly attributed to the invention and widespread adoption of rotary dairy platforms, which enabled efficient milking of larger herds. Additional technological advances—such as, but not limited to genetic improvements and better cropping systems—boosted production per cow, driving rapid growth in farm-level production during the period of intensification. Although the number of cows and hectares per average New Zealand dairy farm has remained relatively stable since 2010, milk production has continued to rise. This growth is largely due to the intensification of farm systems (Luo and Ledgard 2021), ongoing innovations and improvements in farm systems that have unlocked higher production per cow (Table 1).

Financial Position

Over the period examined the economic performance of dairy farms also experienced change, both in terms of the financial performance and position. In this article we will summarise three measures of financial position: total return on assets, debt to asset ratio and real growth in equity.

It was not possible to estimate total return on assets for the full 60-year study period due to missing data in the earliest versions of the publication. However, data from 43 seasons is available and shows a declining trend in the percentage of total return on assets (Figure 1). This downward trend stands in contrast to the growth in both nominal and real total returns (which include net returns from dairy, net non-dairy returns, and changes in capital value). While total returns have increased over time, the rise has been relatively modest compared to the growth in asset values—particularly land and buildings. The combination of marginal increases to returns and material increases to asset values lead to a steady decline in total return on assets over the 43 years.

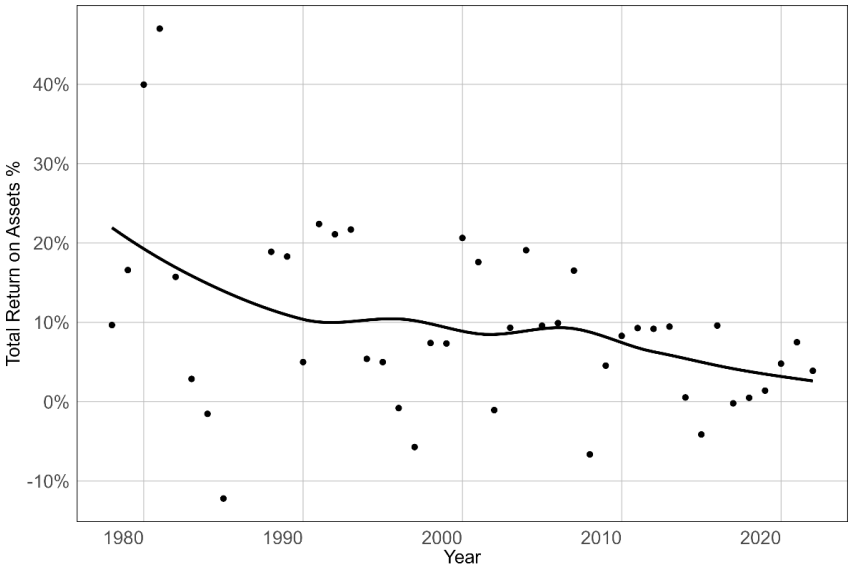

Figure 1 Average total return on assets for the last 43 seasons

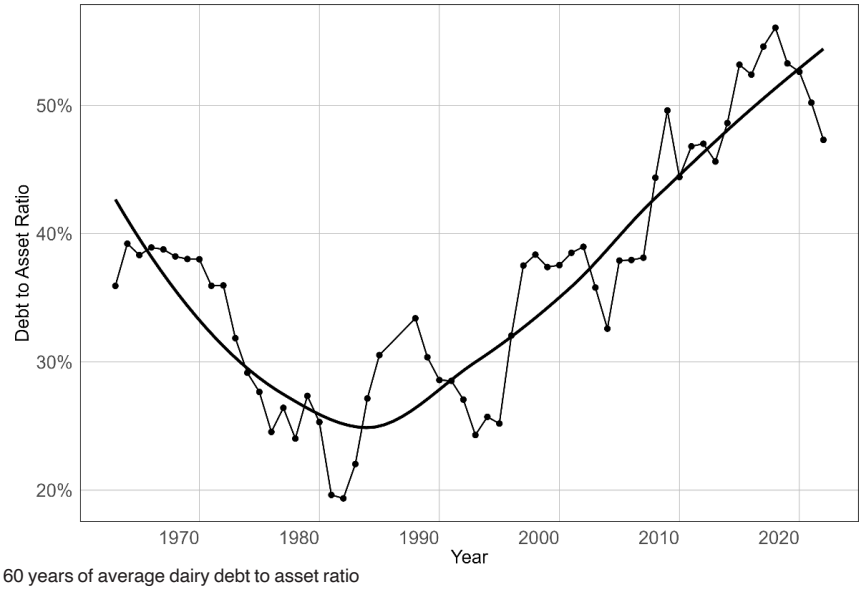

Figure 2 60 years of average dairy debt to asset ratio

This reduction in total return on assets in conjunction with decreasing variation across the period suggest that the sector has matured towards its steady state – consistent with the observations around the physical size of the sector.

The average debt to asset ratio of the dairy farms has fluctuated between 20 (early 1980s) and 60% over the last 60 years and is visualised in Figure 2. The metric is the most sensitive to pressures within the sector given economic upturns in the sector tend to increase land values, improving the ratio while in economic downturns tend to decrease or stagnate land values while also pressuring farmers to take on additional debt. The debt to asset ratio peaked at 56% in 2018, coinciding with the peak of the sector in terms of cows and hectares demonstrating the role of debt in the expansion of the sector. In the years since its peak the sector has repaid significant amounts of debt owning largely to favourable margins and concurrent relatively stagnant land prices.

The average real closing growth in equity describes the growth in owners equity from the end of one

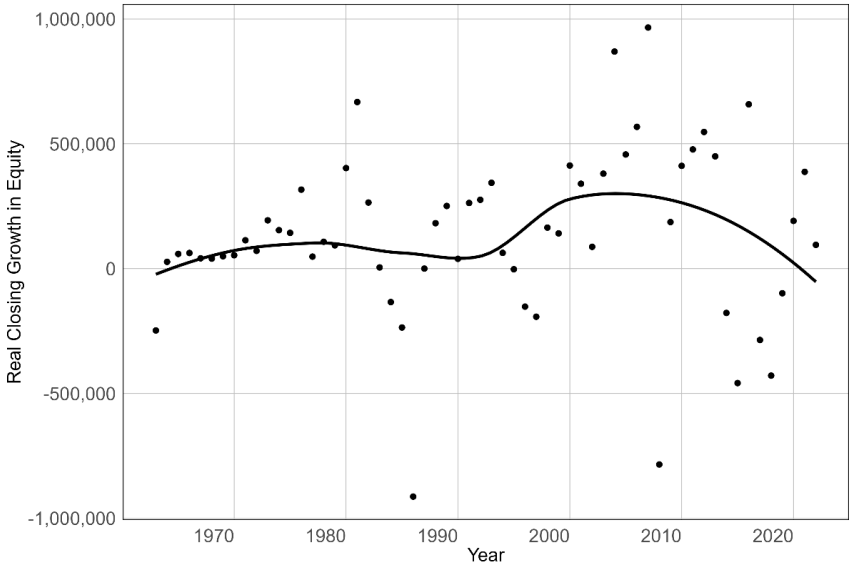

Figure 3 60 years of average dairy real closing growth in equity

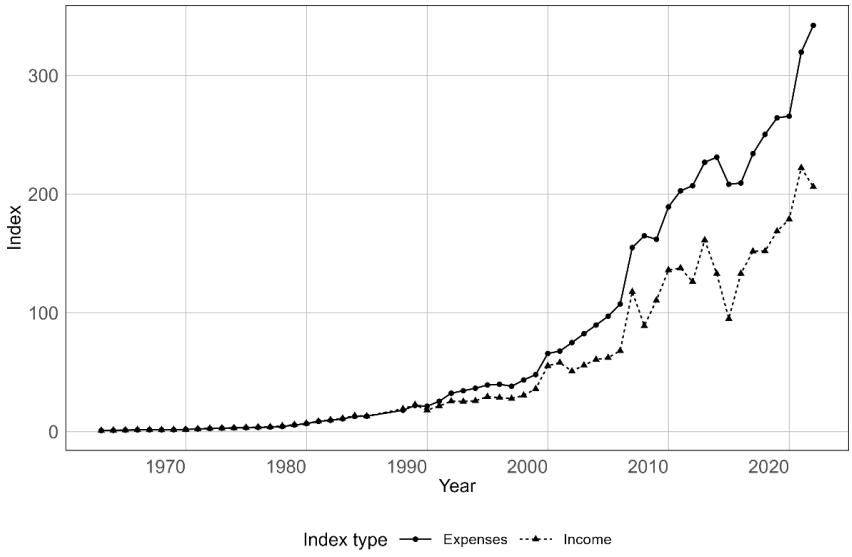

Figure 4 60 years of dairy indexed real income and expenditure

season to the next and despite large variation, tends to be positive indicating wealth creation within the sector over time. However, the increase over the late 90s and early 00s exemplifies the gains available over a period of expansion and intensification, largely in land values (Figure 3). We also see that there has been more variability in growth in equity since 2000, and, while there are seasons where equity growth is negative those seasons are less frequent than positive seasons highlighting the resilience of the sector, but also the requirement for businesses to be able to withstand poor seasons when they inevitably occur.

Financial Performance

The second aspect of economic performance examined is financial performance, which is analysed through several approaches to real and nominal income and expenditure. Over the study period both income and expenditure have developed markedly, however farmers have relatively less control over their income given they

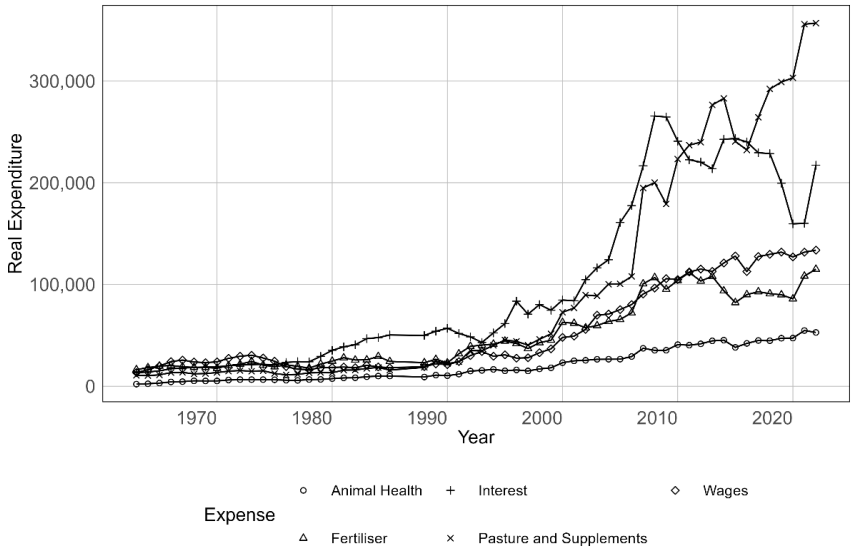

Figure 5 60 years of selected real expenses

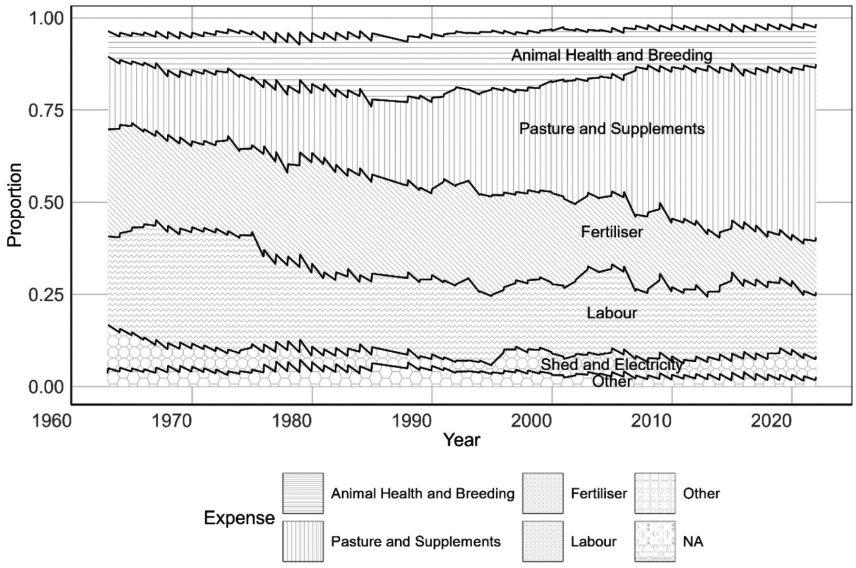

Figure 6 Proportion of average total dairy cash expenses over 60 years

are price takers when it comes to the milksolids they produce. They can, however, control the quantity of milk they produce (Table 1). Indexed income (net dairy cash income) and expenditure (total dairy cash expenses) over time demonstrate that since 2000 the growth of both income and expenditure has increased, however, expenditure has been growing relatively faster than income (Figure 4).

Through the 1980s we see that real expenditure on selected line items generally moved together, after which interest diverged from trend in other items due to both high interest rates and larger mortgages (Figure 5). Post 2000 the line items were moving differently to the first 30 years owing to the period of expansion and intensification (Figure 5).

The proportion of total dairy cash expenses over time describes how the composition of farm expenditure has evolved. If a particular expense maintains the same proportion year after year, it means that its share relative to total farm expenditure has remained consistent—not that the actual dollar amount spent on that item has stayed the same. Over the study period animal health

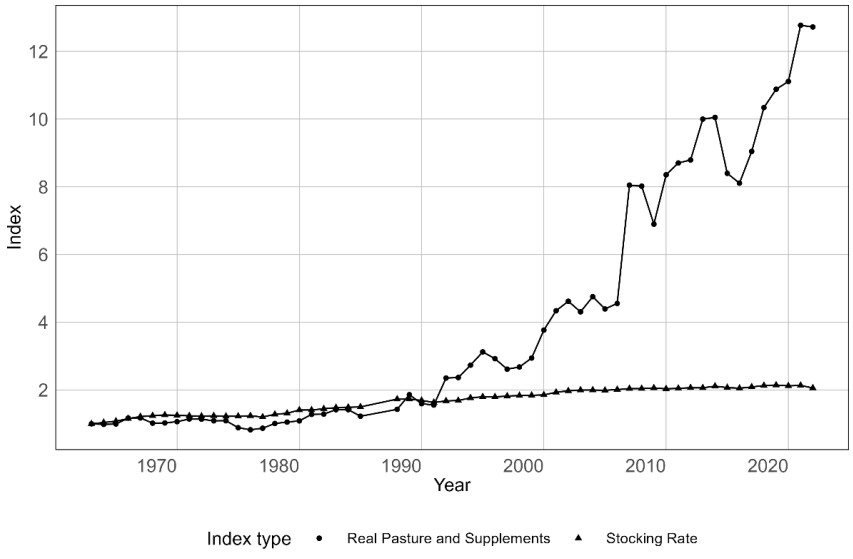

Figure 7 60 years of average spending on feed relative to stocking rate

and breeding, shed and other expenses have largely represented a consistent proportion of expenditure (Figure 6). Pasture and supplement expenditure has proportionately increased while fertiliser and labour have proportionately decreased (Figure 6).

Indexing average real spending on pasture and supplements per hectare relative to the average stocking rate demonstrates that average expenditure on pasture and supplements has increased (Figure 7). Over the study period real indexed pasture and supplements grew by a factor of twelve, and a factor of eight since the turn of the century (Table 2). Furthermore spending on pasture and supplements increased by more than 80% per decade for three consecutive decades between 1980-2010.

Indexed stocking rate however has grown at a relatively slower rate than indexed pasture and supplements. It increased by a factor of two over the 60 years and has largely remaining stable since the turn of the century. The largest percentage change in indexed stocking rate was over the 1980s when it increased by 23%, noteably it has marginally decreased in recent years (Figure 7). Taken together this suggests that on average dairy farmers are spending more to feed their cows than they have historically. However, the inflation adjustment section is especially material in this instance given the comparison between inflation adjusted figures and unadjusted physical terms – in other parts of this article where CPI is used it is applied to all terms in the analysis which makes any understatements consistent. That is to say we cannot say with confidence we have removed all inflation from spending on pasture and supplements and therefore those farmers are definitely spending more on pasture and supplements than ever before.

Conclusions

The Economic Survey chronicles New Zealand's dairy sector for 60 years in a profound evolution from predominantly small holdings to a significant global competitor. At the start of the period studied farms were on average 92 cows on 59 hectares (1.6 cows/hectare) and evolved to 411 cows on 143 hectares (2.9 cows/hectare). This transformation reflects decades of technology development and adoption, shifting market access and conditions, and an evolving regulatory framework.

Two key themes emerged through the analysis: persistent farm consolidation (fewer but larger farms leading to fundamental shifts in business structure, capital requirements) and the sector's progression to achieving greater physical and economic stability after decades of growth and volatility under a wide array of regulatory, environmental and market related challenges. As the sector looks ahead to the next 60 years, the consolidation and maturity of the dairy industry reflect its resilience and long-term sustainability, while it continues to maintain a competitive edge over other primary industries.

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