# IMPACT OF WATER BUYBACK ON THE SMDB DAIRY INDUSTRY

## Potential impacts for dairy farms, processors and suppliers

Report for Dairy Australia

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# EXECUTIVE SUMMARY

Dairy Australia, on behalf of the Australian dairy industry, engaged Ricardo and Farmanco to assess the potential impacts of water entitlement purchases (buyback) upon the dairy industry in the southern Murray Darling Basin (sMDB). This report seeks to provide a better understanding of how buyback may affect dairy farm businesses, dairy processors and local economies over time under two recovery scenarios:

- a moderate scenario (302 GL of total buyback), and
- a higher-impact scenario (683 GL of total buyback).

This work builds on previous analysis undertaken on this topic, including by the Australian Bureau of Agricultural and Resource Economics (ABARES), and it draws on detailed individual dairy farm data provided through the Dairy Farm Monitor Project (DFMP).

The analysis in this report was conducted in three parts:

- **Farm-level impact assessment (Part A)**: Assesses the potential farm-level impacts of buyback, including financial pressures, adaptation strategies, and implications for milk production.
- **Impacts of buyback on dairy processors (Part B)** – funded by the Australian Dairy Products Federation (ADPF): Evaluates how reduced milk supply resulting from buybacks could affect dairy processors, including manufacturing plant viability, supply chain adjustments, and operational costs.
- **Input supplier impacts and local expenditure analysis (Part C)**: Examines the potential impacts of higher costs and reduced raw milk production on input suppliers and local economic expenditure.

The key findings with greatest relevance for government, industry and dairy businesses across this suite of analyses are summarised below.

### *Buyback will materially decrease the consumptive water pool in the sMDB*

Buyback can directly result in dairy farmer exit and adjustment decisions if farmers decide to sell entitlement to the Commonwealth and cease or reduce irrigation. However, ABARES, Ricardo and others have shown that water entitlement purchases reduce the consumptive pool of allocation available to all irrigators resulting in higher allocation prices. Therefore, **all remaining dairy farmers in the southern connected MDB would therefore be affected by a buyback program**, particularly if they are reliant on allocation markets.

Ricardo extended ABARES' analysis of three buyback scenarios (125GL, 225GL and 325GL) to model the effects of two additional scenarios on the dairy industry. ABARES estimated a reduction in dairy water use of between 3% to almost 8%, while Ricardo's upper-end buyback scenario resulted in a 16.5% reduction. These values reflect a material decrease in water availability for dairy farmers and will contribute to potentially significant water allocation price increases, particularly in dry years.

### *Reductions in the consumptive water pool could significantly increase allocation prices in the sMDB*

Water buybacks lead to higher water allocation prices, reducing water availability for dairy farms. ABARES' identified price elasticity of demand for water allocations (i.e. a 2.5% price increase per 1% reduction in water availability), was applied to estimate the price impacts of buyback for this analysis. Assuming proportional purchases across the sMDB, this leads to a reduction in the consumptive pool of water entitlements, with analysis showing that allocation prices would likely rise significantly:

- The 302 GL buyback scenario results in a 7-8% reduction in consumptive water availability, and **price increases of around 17.5%.**
- The 683 GL scenario results in a 16% reduction in consumptive water availability, and **price increases of around 40%.**

### The extent and timing of buyback contributes to significant uncertainty for the dairy industry

A range of water recovery scenarios are plausible and there is a great deal of uncertainty in the quantity, timing and types of entitlements that could be purchased by the Commonwealth. Ricardo has based this assessment on two plausible scenarios: one of 302 GL, which is similar to the upper-end of the ABARES analysis, and a higher scenario of 683 GL which is considered plausible if the government recovered a large proportion of the 450GL target through buyback as well as a significant shortfall against the Sustainable Diversion Limit Adjustment Mechanism offsets or supply measures.

### *Dairy farms will adjust their strategies in response to buyback based on seasonal conditions, market factors, and their long-term financial outlook*

Allocation price increases place financial pressure on dairy farms, particularly those with limited water entitlement holdings. For the farm-level impact analysis in Part A, historical DFMP case study data for 11 farms was modelled as a baseline for quantitative analysis of the two buyback scenarios. The expected allocation price increases were applied in turn to each farm's baseline data to establish the likely financial impacts.

The implications of higher allocation prices for dairy farmers depends on a range of factors, including their production system and extent of owned entitlements. Farm responses were therefore analysed across three adaptation pathways:

- Pathway A: Purchasing water allocations at higher prices to maintain production
- Pathway B: Substituting purchased feed to offset reduced water availability
- Pathway C: Reducing herd size and milk production.

The final pathway, industry exit (either with or without the sale of entitlement to the Commonwealth), was not modelled due to inherent uncertainty and complexities, although it was considered in depth qualitatively throughout this report.

The analysis found that financial impacts varied significantly between farms:

- On average for Pathway A, farm earnings before interest and tax (EBIT) decreased by -10% to -19%, while operating costs increased by 1% to 2%. There was notable variation across farms depending on water entitlement ownership and cost structure.
- On average for Pathway B, EBIT decreased by -37%, and operating costs increased by 6% due to additional feed purchases. Some farms fared better depending on their reliance on purchased feed and entitlement ownership.
- On average under Pathway C, EBIT decreased by -6%, and operating costs actually fell by 7% due to lower costs associated with milk production. Farms under this pathway experienced varying levels of milk production loss, averaging -21% across the case studies.

This indicates that the financial impact of each pathway varied across farms and years, with no single response consistently leading to the lowest financial losses. While Pathway A generally had smaller percentage reductions in EBIT, the dollar impact was still significant for some farms with high water purchase needs. Pathway B often resulted in large EBIT reductions due to the cost of purchased feed, though some farms managed to offset this impact. Pathway C showed the greatest variability, as farms that could sell livestock sometimes improved EBIT, while others faced severe losses. In practice, farms facing substantial financial strain under one pathway **would likely adjust their strategy to minimise long-term impacts**, and some may be willing to absorb shorter-term losses to avoid herd reductions.

### *Periods of severe drought will exacerbate farm financial losses due to buyback, especially for those with low entitlement ownership*

Farm financial impacts were particularly acute under the "extremely dry" year modelled. Ricardo modelled a hypothetical "extreme dry" scenario based on DFMP data provided for the 2019-20 water year (a dry year), with two key adjustments:

- 20% more allocation water was assumed to need be purchased dairy farmers to account for increased on-farm demand because of dry conditions.
- Observed allocation prices were set to $800 per ML, reflecting the prices observed at the height of previous extreme dry sequences (in 2007-08 and 2019-20). This price was then increased by 17.5% increase (under the 302GL scenario) and 40% (under the 683GL scenario), in alignment with ABARES' defined elasticity relationship.

During this "extreme dry" year, the financial impacts on farms were severe, particularly for those with lower water entitlement ownership. Under Pathway A, EBIT reductions ranged from -168% to -431%, with worst affected farms facing losses over $500,000. Operating costs increased substantially, with the worst-affected farms seeing a 40% rise in costs. In Pathway B, the substitution of feed for water resulted in significant EBIT losses, with worst affected farms experiencing reductions as high as -535%. Operating costs also rose sharply, with increases of up to 38%. These impacts highlight the vulnerability of farms under extreme drought conditions, especially those reliant on water purchases or feed substitutes. The additional financial pressure during an extreme drought event may exacerbate the prompt for herd reductions or exit. [1]

### *Farms with low entitlement ownership face the highest risks of falling production and industry exit*

Farms with low entitlement ownership are most vulnerable to sustained financial losses in the face of buyback, and particularly in extended drought conditions. This places them at greater risk of needing to cut production or exit the industry.

- Farms with lower water entitlement ownership are most vulnerable to allocation price increases driven by buyback. These farms are more likely to experience sustained financial losses under higher water prices, and particularly under drought conditions, therefore limiting their long-term viability without structural adaptation.
- Farms with moderate entitlement ownership showed resilience under moderate seasonal conditions but faced sometimes significant financial pressure in very dry years. This increases the likelihood of difficult decisions, including herd size reductions and industry exit.
- Farms with higher entitlement ownership were far more insulated from financial pressures associated with buyback due to their secure water entitlements.

Given the extent of potential financial impacts, it is reasonable to assume that some dairy farmers may choose to exit the industry, either earlier than anticipated (such as by bringing forward retirement) or as a financial necessity. They may do so by selling entitlement to the Commonwealth, particularly if premiums are available. ABARES found that dairy water use would decrease by almost 8% under a 325 GL buyback scenario. It is reasonable to expect that this would occur through a combination of exits as well as farmers adopting pathway B and C (purchasing fodder instead of allocation; or reducing herd sizes). Several stakeholders interviewed for this analysis noted the significant reduction in dairy farms and milk production in the sMDB over the last 10-20 years. It could also be expected that some dairy farms may transition to beef production or cropping systems due to the changing economic landscape and the reduced profitability of dairy farming.

> A large buyback scenario is likely to have a material negative impact on the dairy farm sector.
>
> Some dairy farmers may use the buyback as an opportunity to exit, resulting in reduced economic activity and further reducing the milk pool. Remaining farmers will need to manage with higher input costs associated with higher allocation prices, with little potential to pass these on to processors or consumers. These higher costs are likely to adversely affect the viability of dairy farmers particularly during droughts and particularly where farms are reliant on pasture-based systems with lower levels of owned high reliability/security entitlement.

### *Milk production in the sMDB may decline by between 3% to 15%*

The potential impacts of reduced milk production resulting from buyback at the industry level were then quantified, drawing from both the modelled findings and building upon previous work from ABARES. This found that overall, **annual milk production in the sMDB could decline by between 3% (approximately 60 million litres) to 15% (approximately 270 million litres)**. The scale of milk production losses will ultimately depend on the extent of buyback, how many farms exit the industry, the extent of herd reductions, and the ability of the industry to adapt through feed substitution and improved water efficiency.

### *Reduced milk production will exacerbate existing pressures on dairy processors*

Reduced milk production in the sMDB resulting from buybacks will exacerbate existing pressures on dairy processors. The key impacts identified through industry consultation and analysis include:

- **Limited ability to pass rising costs onto consumers**, given the competitive global and domestic retail market, increasing the likelihood of reduced profitability and greater import substitution. Processors are largely price takers, with little power to influence retail prices. As input costs rise due to buybacks and transport challenges, many face reduced market share from imported products.
- **Increasing competition for a contracting milk supply**, leading to higher input costs and reduced plant utilisation. Processors with plants built for larger milk volumes could face rising unit costs and

[1] Large percentage changes in EBIT reflect farms with low baseline EBIT, where moderate dollar losses result in amplified percentage effects. These results are illustrative and do not represent forecasts or expected outcomes.

lower efficiency. Plants designed for high milk throughput may struggle to maintain profitability as they operate at lower capacity.

- **Increased transport and logistics costs**, as processors adapt to source milk from regions further away (e.g., Gippsland, western Victoria, Tasmania) to maintain throughput and efficiency. Transport costs have already risen significantly, with anecdotal increases of up to 40%. The need to transport milk over longer distances could increase costs and also reduce efficiency, affecting overall supply chain stability.

### *A reduced milk pool in the sMDB will affect dairy processers over a wider geographic area*

The effects of water buybacks on the viability of dairy processors are likely to extend beyond the sMDB. This is due to the significant distances over which milk is currently transported for processing. Milk will increasingly be moved from Western Victoria and Gippsland to northern Victoria, and as far north as Queensland for the domestic fresh milk drinking market. As processors face increased financial pressures from higher production costs and reduced milk supply, these broader transportation networks may experience disruptions, with potential implications for regional economies, milk prices, and supply chain stability.

### *Buyback and adverse market conditions will likely lead to further consolidation in the dairy processing sector*

The combination of buyback-driven cost and milk supply impacts, and ongoing market pressures, including import competition and product substitution, is expected to accelerate consolidation in the dairy processing sector.

Milk production in the MDB has fallen by approximately 25% since 2012, driven by farms exiting the industry, shifting land uses, and water availability constraints.[2] This decline has contributed to an imbalance in the processing sector, as many existing processing plants were built to handle significantly larger milk volumes than are now available.

There is a growing risk of further processor closures or industry consolidation, particularly among smaller processors or those manufacturing lower-margin, commodity dairy products (e.g., milk powder and bulk butter), which are highly exposed to global price competition. Most stakeholders interviewed agreed that competition across the market for milk supply would mean that small processing businesses and those producing lower value products would be hardest hit by reduced total production. These processors face the dual challenges of higher production costs and limited ability to pass these costs onto consumers. There is also excess processing capacity within the sector as some processors struggle to remain profitable with underutilised facilities. 17 dairy processors have announced a closure over the past two-and-a-half years. [3]

This could mean that the exit of entire processors or plants is hastened, or that lower value production lines in some areas cease production. In the long term, this could lead to market exit and further restructuring. In the long term, buybacks will further accelerate these structural changes, favouring processors who can adapt by improving operational efficiency, shifting to higher-margin products, or restructuring their supply chains. Processors unable to adapt effectively will face heightened risks of reduced profitability, plant closures, and further consolidation within the industry.

### *Reduced dairy farm expenditure will flow through to local suppliers, rural services and their communities*

The financial pressure placed on dairy farms by buybacks will not be contained within the farm gate or the processing sector. As farm margins are squeezed and earnings decline, expenditure on inputs such as feed, labour, repairs, and services will also contract. This reduces income for a range of local suppliers, many of whom are highly reliant on the dairy industry and operate in smaller regional towns with limited opportunities to diversify.

Smaller suppliers and local service providers are likely to be the most vulnerable, especially where they depend on a stable customer base of nearby farms. While reductions in farm expenditure may be larger in dollar terms for larger farms, small and medium farms often support more locally concentrated economic activity and have fewer pathways to adapt. This means that the impacts of even modest reductions in milk production may be uneven but significant. Some rural suppliers, particularly those focused on dairy-related services, may struggle

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[2] Dairy Australia, 2024.
[3] ADPF, May 2025.

to adapt or diversify, increasing the risk of job losses or business closures. Once lost, these services can be difficult to replace, compounding the longer-term economic effects of dairy sector contraction in affected regions.

### *Limitations of analysis and avenues for further research*

This analysis was undertaken within the constraints of a modest project budget and available data. There is significant scope for further research to occur on the nature of dairy industry impacts once there is clarity regarding the extent of buyback, and the specific entitlement types recovered from which regions. Given the potential scale of buyback under current Basin Plan settings, a deeper evidence base is essential to ensure informed and balanced decision-making. Further research into the extent of dairy farmers' reliance on the allocation market would also be valuable, providing a stronger evidence base for how changes in water availability and pricing affect farm viability and decision making.

Reliance on historical case study data, as used in this analysis, may not be reliable for predicting future impacts. This is due to factors including fluctuations in milk and allocation prices, especially under prolonged dry conditions. Results should be interpreted within the limitations specified in the report. However, it is clear that buybacks, particularly under a high recovery scenario would likely have a materially negative impact on the dairy farm and processing sector.

# PART A: FARM-LEVEL IMPACTS OF BUYBACK

## 1. PURPOSE AND CONTEXT

### 1.1 PURPOSE

Dairy Australia, on behalf of the Australian dairy industry, engaged Ricardo and Farmanco to assess the potential impacts of water buybacks upon the dairy industry in the southern Murray Darling Basin (sMDB). This analysis aims to provide a clearer understanding of how water recovery may affect the industry, how these impacts are distributed, and the conditions under which they may be most severe.

Water buybacks reduce the consumptive pool available for all water users, including dairy. As a result, water allocation market prices increase over the long term, and holding all else constant, this will increase the cost of producing milk where farms are exposed to the allocations market. With less water available and higher production costs, production decisions across all irrigated industries in the sMDB will be affected as water moves from lower, to higher value uses. While water availability is a bigger driver of on-farm production, water recovery will lead to reduced production. This can lead to a reduction in the gross production value of the dairy industry as well as and downstream (flow-on) impacts through supply chains.

This analysis draws from historical farm budget data to better understand the potential farm-level financial and production impacts of Commonwealth water entitlement purchases (“water buybacks”) upon sMDB dairy farm businesses. Specifically, it seeks to understand how changes in water availability and allocation prices may affect farm financials, water use and milk production.

**Box 1: Purpose of this analysis**

- To define and estimate the impact of two water buyback scenarios on the consumptive water entitlement pool and water market allocation prices.
- To model case study dairy farm budgets under two buyback scenarios to assess how changes in water availability and allocation prices may affect farm finances, water use, and milk production.
- To analyse the financial and production risks faced by dairy farmers under different seasonal conditions and buyback scenarios, identifying key factors that influence viability and resilience.
- To examine the broader economic implications of water recovery for the dairy industry and identify avenues for further research.

## 1.2 CONTEXT

The Commonwealth government has been implementing water buybacks in the Murray-Darling Basin as part of its broader water recovery efforts. However, significant uncertainty remains regarding the extent and timing of future purchases and the impacts this may have upon different industries. This uncertainty raises concerns regarding the magnitude of potential impacts on water availability, market dynamics, and regional industries and communities reliant on affected industries.

Existing research, including recent work by ABARES[4] (refer below), has highlighted the effects of potential water buyback scenarios on water allocation prices. However, there is limited detailed analysis of the specific impacts on individual industries, particularly the dairy industry. Given the dairy industry's dependence on irrigation and its sensitivity to changes in water availability and costs, understanding these impacts is critical for understanding, developing and actioning credible industry adaptation pathways. This report seeks to address this knowledge gap by examining the potential consequences of water buybacks on dairy farm businesses, providing industry-specific insights into financial and production risks.

### Box 2: ABARES' 2024 analysis of the impacts of further water recovery in the sMDB

ABARES report outlines several key impacts of water buybacks on the dairy industry in the southern Murray–Darling Basin (MDB). Since dairy farming in the region relies heavily on irrigated pastures and fodder production, changes in water availability and prices significantly affect dairy operations.

ABARES' recent report examines how water recovery measures may affect water allocation prices, water use, and the gross value of irrigated production in the sMDB. It considered three water buyback scenarios with recovery volumes of 125 GL, 225 GL, and 325 GL, which were compared against a baseline scenario involving no additional water recovery. Much of the report's discussion focuses on the 225 GL scenario, although the relationships between water recovery and key variables are logarithmic, meaning that the impacts scale proportionally in percentage terms across the different recovery volumes. For each industry (including horticulture, rice, cotton, and dairy), the analysis examined the effects of water recovery in three key areas:

1. water allocation prices (exploring how a reduction in the supply of water may increase water costs)
2. changes in water use (by quantifying both the reduction in the volume of water applied and the subsequent adjustments in irrigated area, including shifts in groundwater use and carryover practices), and
3. the impact on the gross value of irrigated agricultural production (GVIAP), thereby linking water use changes to overall revenue and production levels.

ABARES found that, for the dairy industry under the 225 GL buyback scenario, **average water allocation prices are estimated to increase by approximately $45 per megalitre (or by 10%** from the baseline of $474/ML (in 2022–23 dollars). Under this scenario, **overall water use in the southern MDB is estimated to fall by about 133 GL per year (a 4% decrease), while water use for pastures specifically is expected to decline by around 6%.** This reduction will particularly impact the dairy industry, which is heavily reliant on irrigated pastures for fodder production, by increasing water costs and necessitating adjustments in production practices. Although initial model results based on historical data suggested only a minimal decline in the value of irrigated dairy production, further analysis - drawing comparisons with the livestock sector - adjusted this figure to an approximate 2% decrease across the southern MDB.

[4] ABARES, 2024, The impacts of further water recovery in the southern Murray-Darling Basin.

ABARES found that the dairy industry is likely to face significant challenges in a future characterised by higher water costs and reduced water availability. Increased water prices will put upward pressure on production costs, potentially forcing dairy farmers to adapt by reducing herd sizes, increasing their reliance on purchased feed, or even shifting from irrigated production to dryland grazing. These adaptations could ultimately erode the competitiveness of dairy relative to other sectors, particularly permanent crops that yield higher returns per megalitre of water (e.g. almonds). In the longer term, the dairy industry may undergo structural changes, necessitating substantial adjustments in production practices to maintain profitability in an increasingly water-constrained environment.

As noted above, ABARES examined the impacts on irrigated agriculture of using buybacks to meet outstanding recovery under the 450 GL target for enhanced environmental outcomes, conducting analysis through comparison of three recovery scenarios of 125 GL, 225 GL, and 325 GL. This analysis builds upon that conducted by ABARES to consider a greater range of outcomes at the higher end of potential recovery targets – namely 302 GL and 683 GL – with a focus on the resulting impacts to and implications for the sMDB dairy industry.

Ricardo engaged early with DCCEEW to discuss the draft approach and methodology for this study, noting alignment with the recent ABARES study. While the ABARES report examined farm-level impacts under specific buyback scenarios, this analysis extends that work by modelling additional buyback scenarios and assessing a wider range of farm responses. These farm-level findings (Part A of this report) also provide key insights for understanding the potential broader industry effects explored in Part B and Part C of this report.

## 1.3 MILK PRODUCTION IN AUSTRALIA AND THE SMDB

Dairy production in Australia is regionally distributed, with the sMDB being one of the country's major milk-producing areas. The region's irrigated dairy farms contribute significantly to national supply.

Table 1 provides an overview of the approximate national annual milk production by region as of December 2023, highlighting the relative contributions of different dairy-producing areas.

Table 1: Approximate national annual milk production by region, as at December 2023[5]

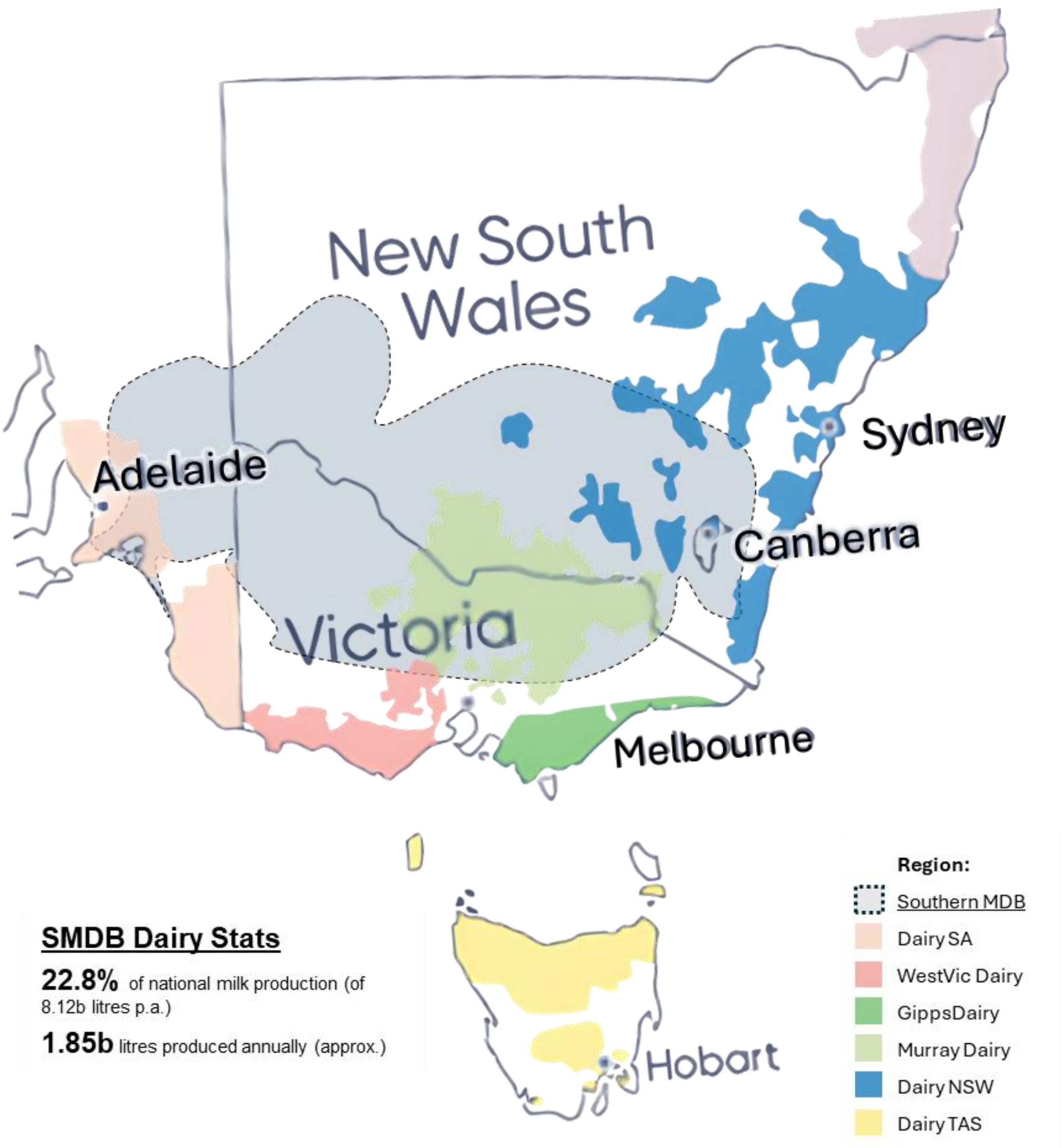
| Region | Milk production (billion litres) | Percentage of National production |
|---|---|---|
| Subtropical region (QLD & Northern NSW) | 0.409 | 5.0% |
| New South Wales (Central, Mid North, South, and Far South Coasts) | 0.728 | 9.0% |
| Gippsland region (South-East Victoria) | 1.816 | 22.4% |
| Murray region (Northern Victoria) | 1.476 | 18.2% |
| Murray region (Southern NSW) | 0.131 | 1.6% |
| Western Victoria | 1.847 | 22.7% |
| South Australia | 0.474 | 5.8% |
| Western Australia | 0.338 | 4.2% |
| Tasmania | 0.906 | 11.2% |

This highlights the significance of Gippsland, Western Victoria, and the Murray region (Northern Victoria and Southern NSW) as Australia's three largest milk-producing regions, collectively accounting for nearly 65% of national milk production. Figure 1 illustrates the major dairy production regions in and surrounding the sMDB.

5 Dairy Australia, 2023. Our Regions. Values in table are rounded.

This provides initial context for understanding how shifts in milk production may impact dairy supply chains and regional economies. Box 3 (section 5.4.1) estimates that there are approximately 950 dairy farms and 272,500 milking cows in the sMDB, offering important context for understanding the scale of the dairy farming sector.

Figure 1: Dairy production regions in and surrounding the sMDB[6]




## 2. APPROACH

This section describes the approach employed to assess the potential impacts of water buyback at the farm-level. The approach was informed through review of the data available through the Dairy Farm Monitor Project (DFMP). The DFMP contains a variety of granular timeseries data about farm physical and financial characteristics, inputs and outputs. Due to the relatively small sample size of farms participating in the DFMP within the sMDB catchment and associated privacy and confidentiality requirements, an anonymised case study approach to assessing buyback impacts was adopted.

6 Derived from Dairy Australia, 2023. Our Regions. Refer to Box 3 in section 5.4.1 for further information.

DFMP datasets for each case study farm were leveraged to examine the financial and production impacts of water buybacks under two recovery scenarios. The DFMP data served as the baseline for scenario analysis, providing insights into farm-level responses and broader industry effects. The study assessed both financial impacts (changes in EBIT and operating costs) and milk production impacts. To understand how buybacks will affect the industry under different water buyback scenarios, this analysis sought to establish:

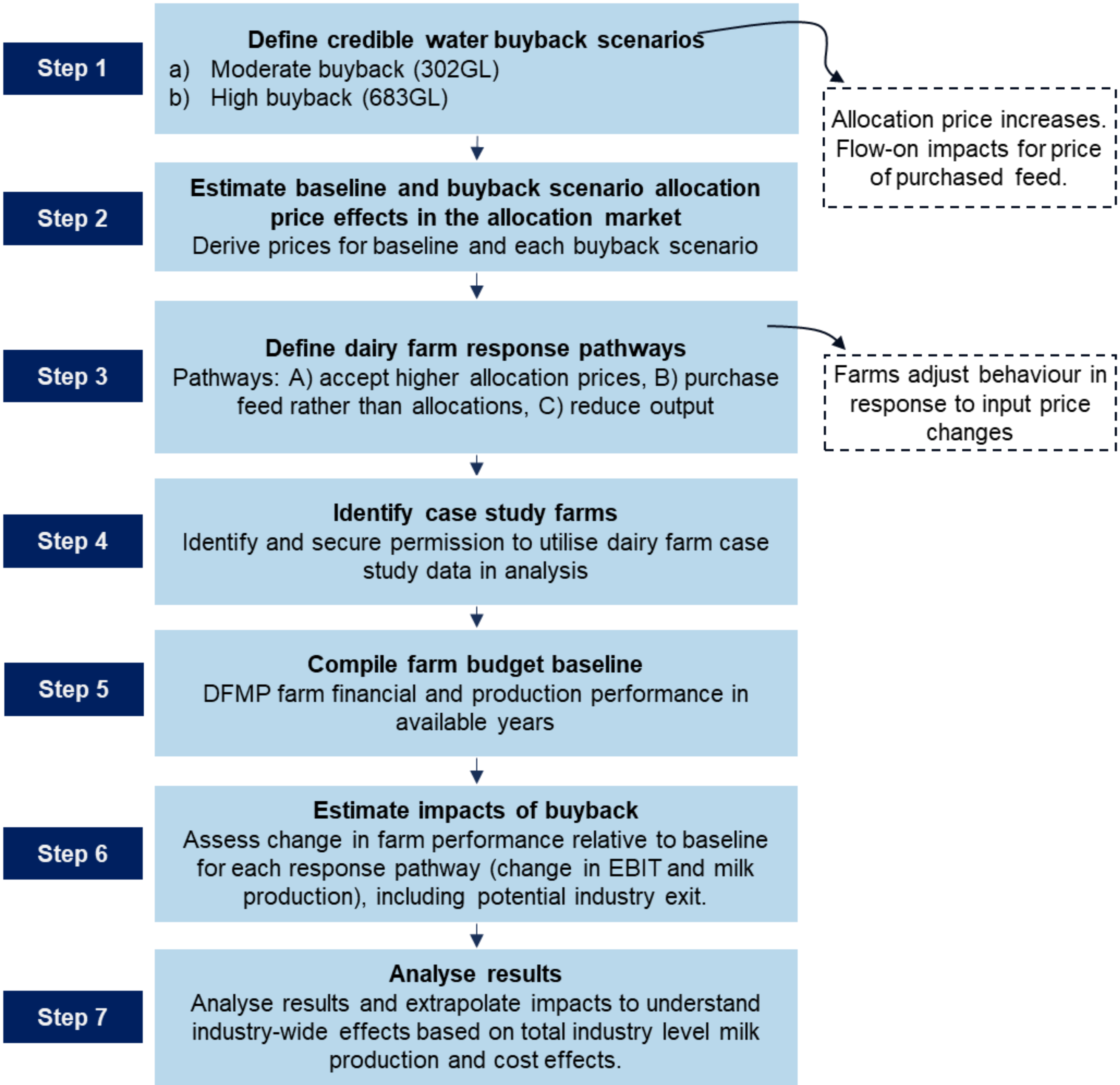
- The farmgate financial impacts due to the reduced consumptive pool and changes in allocation prices
- The potential milk production impacts from the buybacks.

Through qualitative analysis of modelled outputs, the extent to which the buyback might lead to direct entitlement sales and industry exit was also considered.

As summarised in Figure 2, the analytical approach consists of a seven-step process as follows:

1. Define credible water buyback scenarios
2. Estimate baseline and buyback scenario allocation price effects in the allocation market
3. Define dairy farm response pathways
4. Identify case study farms
5. Compile farm budget baselines from DFMP data
6. Estimate the farm-level impact of buybacks through each farm response pathways, and
7. Analyse results and extrapolate impacts to understand industry-wide effects based on total industry level milk production and cost effects.

Figure 2: Overview of farm-level impact assessment




**Step 1: Define credible water buyback scenarios**

Firstly, two credible water buyback scenarios representing a moderate and upper-bound level of potential water recovery were defined. Our analysis sought to build upon recent analysis from ABARES (refer to Box 2 in section 1.2), which examined the potential effects of three further water recovery scenarios upon irrigated agriculture in the sMDB. These three scenarios assumed recovery volumes of 125 GL, 225 GL, and 325 GL, which reflect a low to moderate level of the total potential recovery target. As discussed further in section 3.1, our approach sought to examine the potential impacts upon the dairy industry which may result from a moderate and higher level of recovery.

**Step 2: Estimate baseline and buyback scenario allocation price effects in the allocation market**

The impact of buybacks on farm operations will primarily be felt through increased water allocation prices in the market. To estimate these changes, Ricardo first analysed historical price data in the Murray, Murrumbidgee, and Goulburn allocation markets. These are key markets for dairy in the sMDB, where water prices fluctuate based on the availability and demand for water.

To estimate the impact of buyback on water prices, Ricardo identified the relevant price elasticity of demand (PED) for water allocations in the sMDB as -0.4, based on contemporary studies. This reflects the conditions observed during previous market fluctuations, including drought and high demand and is consistent with the approach used in the recent ABARES report on water recovery impacts in the sMDB.[7]

In addition to the PED, the change in total consumptive water available in the sMDB was calculated for each buyback scenario. For the moderate recovery scenario, a 7% reduction (equivalent to 302 GL) in total water entitlement was assumed, while for the higher-end scenario, a 16% reduction (683 GL) was applied. These reductions were based on the pro-rata share of water entitlement across MDB catchments and were used to adjust water allocation prices accordingly.

The impact on water allocation prices was calculated by applying the PED and the changes in total consumptive water availability to the observed historical water prices in the sMDB markets. This allowed us to model price changes under each buyback scenario, reflecting how water prices might increase as a result of reduced availability.

**Step 3: Define dairy farm response pathways**

Farm response pathways represent the different strategies dairy farmers may adopt in response to rising water allocation prices. These pathways help illustrate how changes in water availability and cost influence farm financial performance, water use, and milk production. In this analysis, three response pathways were defined:

A. maintaining production by purchasing water at higher prices,
B. substituting water with purchased feed to sustain output, and
C. reducing output by limiting both water and feed purchases.

These pathways reflect real-world decision-making processes and provide insights into how different types of farms may adjust under varying water market conditions. Industry exit is another response pathway, however this is considered qualitatively in this report as it was not able to be modelled in a robust manner. Further detail is provided in section 3.4.

The impact of buybacks will not be evenly distributed across all farms. Farms with higher ownership of water entitlements are less exposed to fluctuations in the allocation market and may be better positioned to manage water availability changes. In contrast, farms that rely heavily on purchasing additional allocations may experience more significant financial pressures. These differences in exposure informed the development of the response pathways to capture a realistic range of farm-level adjustments.

**Step 4: Identify case study farms**

Due to the relatively small sample size of farms participating in the DFMP within the sMDB catchment and associated privacy and confidentiality requirements, an anonymised case study approach to assessing buyback impacts was adopted. We recognised the importance of selecting a diverse range of case study farms - varying in business size, water entitlement ownership, and feeding systems - to ensure the analysis reflects a suitable cross-section of farms in the sMDB and allows for meaningful comparisons of farm performance based on these characteristics.

A total of 11 case study farms consented to the anonymised use of their data in this analysis, as discussed in further detail in section 3.3.

**Step 5: Compile farm budget baselines from DFMP data**

Case study farm data was provided to Ricardo for each case study farm. With guidance from Farmanco, a relevant subset of the DFMP data was selected, reviewed, imported and analysed within the model. This provided baseline timeseries data as the basis for further analysis.

**Step 6: Estimate the farm-level impact of buybacks through each farm response pathways**

Given the diversity of farming systems in the sMDB, farm-level impacts were assessed using case studies to understand how different dairy farms may be affected under various water recovery scenarios. Drought conditions and market factors, such as feed costs, were also considered as they influence financial outcomes. While this analysis does not directly model industry exit, it provides insights into financial impacts that may contribute to farm adjustments over time.

[7] ABARES, 2024. The impacts of further water recovery in the southern Murray–Darling Basin.

The potential farm-level impacts of buyback were estimated by applying the three defined response pathways (refer to Step 3) to each case study farm. These pathways examined *how* farms might adjust their operations in response to higher water allocation prices resulting from buybacks.

Each pathway was derived from to the baseline DFMP farm budget data to simulate how water price increases under each buyback scenario would affect financial and operational outcomes. For example, under the Pathway A, farms maintaining production by purchasing water at higher prices would see increased costs due to higher allocation prices, which would impact their earnings before interest and taxes (EBIT). Under Pathway B, where farms substitute purchased feed for water to maintain output, changes in feed prices (which are influenced by water availability) would also affect farm budgets. Under Pathway C, farms reduce their output by avoiding additional (from baseline) water allocation purchases as well as additional feed purchases, resulting in lower production levels and potentially decreased revenues from milk production. However, livestock sales were included as a potential revenue stream under this pathway.

This process examined how each farm might respond to increased water costs, providing insights into the broader impacts on farm financial performance under different response pathways. The results of this analysis served as the basis for understanding the potential range of responses and their associated financial implications.

**Step 7: Analyse results and extrapolate impacts to understand industry-wide effects based on total industry level milk production and cost effects**

Assessment outputs were analysed to examine both the effects on individual farms, and to extrapolate findings out to understand the potential milk production impacts on the sMDB dairy industry. The aim was to assess how changes in water availability and allocation prices may affect different types of farm – based on their size, water ownership, and feeding system – and how this could lead to changes in milk production for the wider industry.

To estimate broader industry effects, case study results were extrapolated using two complementary methods to account for uncertainty in farm responses (see section 5.4). Approach A applies a scenario-based assessment of potential farm responses to estimate milk production losses, and Approach B uses ABARES' estimates of reductions in dairy water use to estimate the corresponding decline in milk output across the sMDB.

# 3. METHODOLOGY

## 3.1 WATER BUYBACK SCENARIOS

The extent to which the Commonwealth will proceed with water buybacks to meet Basin Plan targets remains uncertain. While the commitment to full implementation of the Basin Plan exists, the actual volume of water recovered through buyback programs will depend on various factors, including the success of alternative water recovery measures and the political landscape. To account for this uncertainty, we have adopted a scenario-based approach, similar to the one outlined in ABARES' 2024 report (refer to Box 2 in section 1.2). ABARES considered a range of potential buyback volumes, defining three scenarios at 125 GL, 225 GL, and 325 GL, which provide a framework for assessing the likely impacts of buybacks under different conditions. Our analysis extends this approach by deriving two additional water buyback scenarios (one at a moderate level of recovery and one at a higher level), given the likelihood of additional water recovery requirements under the Basin Plan.

A key part of the water recovery plan is the 605 GL Sustainable Diversion Limit Adjustment Mechanism (SDLAM). This program aims to recover water in two ways:

- Supply and constraint measures - these are changes to river management and physical features that would allow more water to be used for environmental purposes without needing to buy back as much water. That is, these measures aim to achieve equivalent environmental outcomes with less water through measures such as changing river operating rules, and relaxing physical features that 'constrain' the ability to deliver water for environmental outcomes.
- Efficiency projects - these involve improving irrigation channels and systems, and other water-use practices to save water, which can then be redirected to the environment.

However, the current status of SDLAM projects indicates that not all of the targeted water recovery will be achieved through these measures alone. There may be a shortfall, which will need to be covered by water buybacks. The exact size of this shortfall is unclear, however, the Murray-Darling Basin Authority (MDBA) in 2022 provide an estimate of the likelihood that certain SDLAM projects will be completed. [8]

While the outcome from the 605GL SDLAM will not be known until 31 December 2026, and the Commonwealth has not put forward a plan to recover any shortfall to the target, this report contemplates a scenario where water purchase is used to meet a potential shortfall.

To model this uncertainty, two water recovery scenarios were defined based on the MDBA's report. These describe a moderate and large buyback respectively, and are differentiated based on the extent to which 605 GL is recovered through SDLAM projects, and 450 GL is recovered via efficiency projects.

- **Scenario 1 – 302 GL water recovery:** assumes only SDLAM projects in operation are completed, and all remaining projects are incomplete. The level of operation is based upon MDBA reporting.[9] This represents a 54% shortfall on SDLAM targets. This scenario represents a moderate buyback.
- **Scenario 2 – 683 GL water recovery:** assumed SDLAM projects of 'extreme' and 'high' probability of completion are not completed, and the full additional 450 GL is recovered through water purchases. This provides a likely 'upper limit' scenario for the analysis which remains within realistic limits.

The estimated reduction in total consumptive water availability under the assessed buyback scenarios are 7% for a 302 GL recovery and 16% for a 683 GL recovery. These figures were calculated by applying the long-term diversion limit equivalence (LTDLE) of each sMDB catchment to determine the total percentage reduction in consumptive entitlements on issue (EOI). The reduction was applied proportionally across all sMDB catchments to provide a system-wide estimate of changes in consumptive water availability.

The estimate of total consumptive water availability used in this analysis is approximately 4,300 GL (LTDLE). This figure is based on entitlements from major entitlement types across the southern connected Basin. [10] It excludes volumes relating to supplementary entitlements, which are only available under high-flow conditions. The estimate also excludes the Broken, Loddon and Campaspe systems, which represent a small share of total entitlement volume and are less integrated into major allocation markets. The EOI data are sourced from state water registers, using the most up to date available data at time of publication.

The implications of these reductions extend beyond entitlement holders who directly sell water to the Commonwealth. As water buybacks reduce the total consumptive pool, they also affect all remaining irrigators by increasing competition for allocations, thereby influencing allocation market prices.

Using ABARES' identified price elasticity of demand for water allocations (i.e. a 2.5% price increase per 1% reduction in water availability), we can estimate the price impacts for this analysis. [11] Under the 302 GL scenario (i.e. resulting in 7% less consumptive water availability), prices would increase by approximately 17.5%, and under the 683 GL scenario (resulting in 16% less water), prices would increase by 40%. [12] **Therefore, a buyback of between 302 GL to 683 GL could increase allocation prices between 17.5% to 40%, significantly increasing costs for irrigators across the sMDB.**

The following section details how these reductions translate into estimated price effects using a demand elasticity approach consistent with ABARES' 2024 report.

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8 Murray-Darling Basin Authority, 2022, Sustainable Diversion Limit Adjustment Mechanism: 2022 Assurance Report

9 Murray-Darling Basin Authority, 2024, Progress of sustainable diversion limit adjustment mechanism projects

10 These are SA Murray HS, Vic 6 Murray HRWS and LRWS, Vic 7 Murray HRWS and LRWS, Vic1A Goulburn HRWS and LRWS, NSW 10 Murray GS and HS, NSW 11 Murray GS and HS, NSW Murrumbidgee GS and HS, NSW Lower Darling GS and HS.

11 There is inherent uncertainty in estimating price elasticity of demand for water allocations, particularly under extreme water market conditions. The short run elasticity value used in this analysis is drawn from recent ABARES modelling and reflects the best available published evidence based on historical market responses. In the long run, demand may be more elastic if enterprises exit irrigation in response to high prices.

12 These percentage increases are relative to the recorded baseline prices paid by each farm in each year within the timeseries dataset. This approach ensures that the analysis is grounded in accurate, real-world data, capturing the diversity of water market conditions across different farms. It also accounts for variations in trading conditions, recognising that some farms benefit from more favourable trade terms than others, and that allocation prices differ across market zones.

## 3.2 PRICE EFFECTS IN THE ALLOCATION MARKET

This section describes the method used to estimate changes in water allocation prices for case study farms due to the changes in water supply under each water buyback scenario. This method utilises price elasticity of demand to measure the price effect of changing water supply.

To estimate this impact on allocation prices, we adopted a methodology consistent with that used in ABARES's 2024 report.[13] ABARES estimated price effects for three buyback scenarios (of 125 GL, 225 GL, and 325 GL) using a price elasticity of demand approach. Our analysis follows the same method, extending it to assess the potential effects of the two buyback scenario volumes assessed through this analysis (302 GL and 683 GL).

By extrapolating ABARES' approach, we ensure methodological consistency while allowing for an evidence-based assessment of price impacts at higher buyback levels. This alignment provides a robust and transparent foundation for evaluating the implications for dairy farms in the sMDB. The following section details the steps taken to estimate price changes under each scenario.

### 3.2.1 Method to estimating price effects in the allocation market

This sub-section describes the steps taken to estimate price effects (or the change in allocation prices as a result of the buybacks) in the allocation market.

#### *3.2.1.1 Calculating baseline on-farm (actual) allocation prices*

Case study DFMP data detailed the annual volume of temporary water purchases for each farm, and the total annual amount spent on allocation purchases. The on-farm observed allocation price for each year was returned by dividing the annual volume purchased by the annual spend.

This provided up to eight years of timeseries data on water allocation purchase prices as a baseline for each case study farm. This provides insights into on-farm decision-making at different water price points, based on observed market transactions.

#### *3.2.1.2 Estimating price effects of buyback scenarios*

Price effects were estimated for each scenario, year and farm using the formula specified in Equation 1.

$$\Delta P_{n,m} = \left(\frac{\Delta W_{total}}{PED}\right) \times P$$

Equation 1 Change in price ($/ML) for a given on-farm observed allocation price

*Where:*
$\Delta P_{n,m}$ is the price effect for farm *n* in the given year *m*
P is the on-farm observed allocation price for farm *n* in year *m*
$\Delta W_{total}$ is the change in total consumptive water available in the sMDB as a result of selected buyback scenario (%)
PED is the selected price elasticity of demand for water allocations

The price elasticity of demand for water allocations (PED) and change in total consumptive water available in the sMDB ($\Delta W_{total}$) for each scenario were both selected based upon analysis of relevant literature and available data. A summary of how each value was selected is presented below.

- **Price Elasticity of Demand (PED): -0.4:** Contemporary literature on the price elasticity of demand in MDB water markets indicates a range of values falling between -0.4 and 3. Water market price elasticity estimates are difficult to model due to uncertainty and complexities relating to market dynamics and interdependencies, data limitations, variability in the behaviour of different market participants, and other exogenous factors.

  The selected price elasticity (-0.4) reflects the price elasticity used in the recent ABARES report *The impacts of further water recovery in the southern Murray-Darling Basin*.[14] This price elasticity is the

[13] ABARES, 2024. The impacts of further water recovery in the southern Murray-Darling Basin
[14] ABARES, 2024. The impacts of further water recovery in the southern Murray-Darling Basin

most reflective of the conditions experienced on-farm over the modelling period. [15] This price elasticity has been adopted by Ricardo for other water markets analysis in the sMDB and is considered to be an appropriate reflection of short-term market conditions.

Our literature review found that, generally, a supply shock will be felt across all markets in the southern connected system. However, the precise distribution of impacts within the sMDB remains uncertain. We have therefore adopted a simplifying assumption that the buyback-induced supply shock will affect a single, connected sMDB market.

#### *3.2.1.3 Estimating price effects under extreme dry conditions*

The likelihood of the sMDB facing very (or ‘extreme’) dry years in future is high, driven by climate factors, and exacerbated by increased demand. This will have a significant impact on farm-level decision making, as farmers seek to minimise the impact of rising costs and reduced water availability upon their bottom line. However, in the available DFMP timeseries dataset, there were no years characterised by extremely dry historic years.

A hypothetical ‘extreme dry’ year scenario was therefore developed to examine the potential financial impacts such conditions may have upon on-farm allocation prices, after buybacks occur.

The hypothetical scenario was based upon the on-farm data provided for the 2019-20 water year (a very dry year) for each year, with two key changes made to the analysis:

- The on-farm observed allocation price (P in Equation 1) was set to $800 per ML for both buyback scenarios. This reflects high prices observed at the height of previous extreme dry sequences (in 2007-08 and 2019-20).
- It was then assumed that 20% more allocation water would need to be purchased by each individual dairy farmer, to account for increased on-farm demand because of dry conditions.

The ‘extreme dry’ hypothetical scenario provides a robust upper bound estimate of price effects for water market participants under extreme conditions, which are expected to become increasingly frequent in future. This approach provided water allocation prices for all farms of $939.13 per ML under the 302GL scenario, and $1,115.18 per ML under the 683GL scenario. Compared to the baseline extreme dry price of $800/ML, this represents an (approximately) 17.5% increase under the 302GL scenario and a 40% increase under the 683GL scenario, in alignment with ABARES’ defined elasticity relationship.

This approach allows for a comparison the potential impact of buybacks in extreme dry conditions, which are not reflected in the current timeseries data available, as this could significantly increase allocation costs for dairy farmers.

### 3.2.2 Key assumptions

Assumptions were made within the price effects model to manage complexity whilst still ensuring credible and realistic parameters. The key assumptions for this analysis were:

- The analysis assumes that water recovery occurs in proportion to entitlement on issue, resulting in balanced recovery across the Basin.
- Results measure the price effect of a change in supply after the entire water recovery target is met under each scenario.
- On-farm observed prices under each buyback scenario were calculated as the total price paid for allocations, divided by the volume of allocations purchased. Variability in the prices paid is likely, depending on the time of year water was purchased, however this was not able to be modelled based on the information available.
- Modelled price effects only consider the impacts of a change in supply due to water recovery on allocation prices. Allocation prices have several drivers that can cause price variability.

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[15] The -0.4 price elasticity of demand reflects short-run conditions, which aligns with the design of this study. While long-run elasticities may be lower due to structural adjustment over time, such adjustment often involves irrigators reducing production or exiting the industry, which is precisely the type of impact this analysis aims to highlight the potential for.

- Price elasticity of demand is applied uniformly across on-farm observed prices. The impacted farms cover multiple regions and could utilise multiple markets to source allocation water. There are likely to be slight differences in the behaviour of each of these markets, which are not covered in this report.

## 3.3 MODELLED FARMS AND KEY CHARACTERISTICS

The sMDB dairy industry is characterised by significant diversity, including in farm size and feeding systems. This diversity reflects varied conditions across the region, resource availability and market access.

For the purpose of this analysis, given the available data and information regarding individual farms, two factors that influence the extent of buyback impacts upon a given farm are:

1. Its water entitlement ownership (relative to its total water use)
2. Its feeding system (particularly the extent to which irrigation water is used to produce feed).

Farm water entitlement ownership is broadly categorised as follows:

- High ownership: Farm owns sufficient entitlement to meet all or almost all of their water needs and have minimal exposure to allocation market price changes.
- Moderate ownership: Farm owns entitlement sufficient to meet approximately 40% to 60% of their water needs and may draw from inventory and/or purchase additional allocations as needed.
- Low ownership: Farm owns entitlement sufficient to meet less than 40% of their water needs and may draw from inventory and/or purchase additional allocations as needed.

Farm feeding systems are defined as follows:

- Low concentrate: This system relies primarily on pasture or fodder, with minimal use of concentrates (grains or supplements). It is typically used when pasture availability is high, and the goal is to maximise grazing. This is common in systems that focus on extensive or pasture-based operations.
- Moderate concentrate: In this system, dairy cows are fed a mix of pasture and a moderate amount of concentrates to supplement their diet, particularly when pasture alone is insufficient to meet nutritional requirements. This approach balances grazing with supplementary feed to optimise milk production.
- High concentrate: This system uses a larger proportion of concentrates compared to roughage, often in situations where pasture availability is limited or when high milk production is a priority. It is commonly seen in intensive dairy operations where cows are housed and fed based on their specific nutritional needs.
- Partial mixed ration (PMR): A partial mixed ration includes a combination of pasture, silage, hay, and concentrates, but these ingredients are not mixed together before feeding. This system provides cows with a more controlled diet while still allowing for grazing, and it is often used to balance feed intake and production levels.
- Total mixed ration (TMR): In a TMR system, all feed ingredients are mixed together before being fed to cows. This system ensures a consistent and balanced diet, optimising milk production and cow health, and is typical of intensive dairy operations where cows are confined and fed with mechanised systems.
- Hybrid system: A hybrid system combines elements of different feeding strategies, such as some pasture grazing with partial mixed rations or TMR. This approach is flexible and can be tailored to the specific needs of the farm, balancing pasture and supplementary feeds to optimise milk production and feed efficiency.

Farms with high ownership of water own sufficient entitlement and would typically receive allocations to meet most or all of their water needs, except in very dry conditions when allocations are reduced. They have low (or potentially no) exposure to the allocations market and are relatively less affected by changes in allocation prices in comparison with farms who own less entitlement. Farmers with no or minimal exposure to the allocation market may respond (or rather, not respond) to increased allocation prices by either doing nothing and/or selling any surplus water on the market. The latter may occur, for instance, if water could be sold for more than it is worth to pursue production. If typical allocation prices go beyond what the industry can afford this would result in industry adjustment over time, as farmers may receive better returns by selling water into the spot market or exiting the industry altogether.

Farms with moderate ownership (loosely defined as owning entitlement sufficient to meet between 40% - 60% of water needs in a typical year) have relatively greater exposure to the market. They own some entitlement but may purchase additional allocations as needed, and in line with their feeding system.

Low ownership assumes entitlement sufficient to meet only 40% or less of farm water needs in a typical year, and high exposure to the allocations market.

Permission was sought to access DFMP data to identify a representative spread of farms with these characteristics. This resulted in 11 farms consenting to their data being used for the development of farm budget case studies, as shown in Table 2.

Table 2: Case study farms' water ownership and feeding system, and indicative size (deidentified)

| Farm | Description | Indicative size of business |
|---|---|---|
| Northern Victoria | | |
| A | Total mixed ration, moderate entitlement ownership | Medium (typical gross revenue between $2M to $6M) |
| B | Total mixed ration, high entitlement ownership | Large (typical gross revenue above $6M) |
| C | Low concentrate, high entitlement ownership | Small (typical gross revenue below $2M) |
| D | Low concentrate, low entitlement ownership | Small (typical gross revenue below $2M) |
| E | Moderate concentrate, high entitlement ownership | Small (typical gross revenue below $2M) |
| F | Moderate concentrate, low entitlement ownership | Small (typical gross revenue below $2M) |
| G | High concentrate, moderate entitlement ownership | Medium (typical gross revenue between $2M to $6M) |
| H | High concentrate, high entitlement ownership | Small (typical gross revenue below $2M) |
| Southern NSW | | |
| I | Moderate concentrate, high entitlement ownership | Medium (typical gross revenue between $2M to $6M) |
| J | High concentrate, moderate entitlement ownership | Large (typical gross revenue above $6M) |
| K | Partial mixed ration, moderate entitlement ownership | Medium (typical gross revenue between $2M to $6M) |

No suitable farms within the South Australian sMDB catchment participate in the DFMP, and South Australia was therefore unable to be included within the analysis.

## 3.4 FARM RESPONSE PATHWAYS

Farmers have several response options in the face of rising allocation prices. Those with low or moderate water ownership are more likely to need to adjust their production strategies to mitigate the impacts of higher input costs. For instance, farms may choose to:

- Maintain production at a loss (i.e. continuing to purchase required allocations at a higher price).
- Maintain production by augmenting feeding systems (i.e. purchasing feed rather than purchasing allocation).

- Reduce output (i.e. ceasing or reducing purchase of allocation, potentially maintaining the existing level of purchased feed, and reducing herd size as required).
- Exit the industry.

The underlying factors which drive these responses are complex. Allocation price, while a significant consideration for farmers, is not the only variable at play in establishing the preferred response for business continuity and profit maximisation (or loss mitigation). Farmers must consider their asset and infrastructure mix and condition in establishing whether it is feasible or desirable to augment feeding systems. They must also consider contracts with suppliers and processors, labour and employment obligations, and the size and maturity of the herd, among other things.

Responses may also change over time; in the short term, some farmers may be willing and able to accept losses, sometimes sustained over several years, in the belief that recovery will be achievable. A decision to reduce the herd is done in the knowledge that rebuilding can take significant time and cost, and in some instances, it is preferable to incur a loss.

Losses sustained over too long a period, a situation compounded by factors such as higher allocation prices, may also lead to industry exit. While this analysis is unable to model industry exit, the results support identification of farms which may be most at risk of this based on financial performance over time.

The modelled farm response pathways are summarised in Table 3.

Table 3: Modelled farm responses

| Farm response | Description | Variables changed from baseline |
|---|---|---|
| Baseline | Uses DFMP data to establish actual farm performance for a given year. | N/A |
| A. Accept higher allocation prices | Farm maintains its output and resource mix, implying the same volume of water is purchased at a higher allocation price. | • Water allocation price<br>• Fodder and concentrate price increase (linking to prevailing seasonal conditions) |
| B. Purchase feed rather than allocations | Farms maintain output, however, no further water allocation purchases are made. The farm alters its resource mix, substituting additional purchased feed (concentrate, fodder) in place of home-grown feed. | • Water allocation price<br>• Volume of allocation purchased (set to nil)<br>• Volume of feed purchased (increased to maintain production)<br>• Fodder and concentrate price increase (linking to prevailing seasonal conditions) |
| C. Reduce output, with no allocation or additional (from baseline) feed purchases | Farm reduces its output. It uses water allocations received plus inventory drawdown (where this is equal to or less than baseline total water use) for home-grown feed but does not purchase additional water. It does not purchase additional feed beyond its typical usage. | • Volume of allocation purchased (set to nil)<br>• Fodder and concentrate price increase (linking to prevailing seasonal conditions) |

This analysis was designed to assess the financial and production impacts of different stylised response pathways under higher water allocation prices. These pathways reflect plausible, real-world decisions that a farm might take, such as maintaining production by purchasing water, substituting feed, or reducing output. This allows for comparison of the resulting impacts across different farms and years.

The model does not attempt to capture the range of external variables and personal circumstances that influence real-world decision-making, such as infrastructure constraints, supply contracts, risk tolerance, and various other farm-specific factors or personal circumstances. Optimising pathway choice for a given farm in a given year was not possible within the scope of the analysis, and it would require numerous additional assumptions and still be unlikely to reflect the diversity of real-world behaviours. Rather, the model provides a structured format for consistent comparative results regarding potential impacts for each farm under each pathway, which are then analysed in the context of external factors and the likely choices farms could make.

It is recognised that water buybacks and the associated increases in allocation prices may impact the price of purchased feed. For modelling purposes, it was assumed that the prices of fodder and concentrate would be influenced by water availability, with the extent of price increases varying according to seasonal conditions.

Feed types that depend more directly on irrigation (such as fodder) tend to exhibit a greater sensitivity to changes in water availability. Under extreme dry conditions, it is reasonable to assume that the price of fodder would increase substantially, while concentrate prices - reflecting products largely produced on dryland - would adjust to a lesser degree. Several simplifying assumptions were made in the model regarding this responsiveness of purchased feed prices to climatic conditions. Collaboration with Farmanco helped to establish the complex relationship between feed prices and water availability. While there is no simple rule of thumb to consistently and accurately predict how feed prices will change in response to changing climatic and demand conditions[16], the simplifying assumptions used in this analysis provide a reasonable approximation of potential price adjustments.

In an 'extreme dry' year (refer to section 3.2.1.3), characterised by significantly reduced water availability, the price of fodder was assumed to rise by 15%, while concentrate prices were assumed to increase by 7.5%. This reflects the greater reliance of fodder production on irrigation, whereas concentrate prices are less sensitive to water availability, as the majority of these products, such as cereal grains and canola, are grown on dryland.

In a 'dry' year, where water availability remains constrained, it was assumed that fodder prices would rise by 10%, with concentrate prices increasing by 5%. For 'moderate' years, where water availability is relatively stable, a more modest price increase was assumed, with fodder prices rising by 1% and concentrate prices by 0.5%. These assumptions align with the established relationship between water availability and feed prices, reflecting varying degrees of price sensitivity depending on seasonal conditions. Refer to section 3.5.1 for further information on seasonal profiles.

### 3.4.1 Industry exit

Industry exit is another response pathway that dairy farmers may choose in response to water buyback and/or unfavourable seasonal conditions leading to an increase in the price of water allocations.

The decision to exit the industry is highly complex, influenced by multiple interrelated factors. This section explores the dynamics of this pathway, particularly as it relates to the impact of buyback. Given the complexity and nuanced nature of the underlying factors contributing to a decision to exit, this response pathway was considered qualitatively in the analysis rather than through modelling.

The decision to exit the industry is not one that can be attributed solely to water buybacks or price changes. It is often the result of a combination of financial pressures, operational constraints, and personal circumstances – such as a decision by a farmer to bring forward retirement.

Refer to section 5.2 for further analysis of this issue.

## 3.5 DEVELOP FARM BUDGETS AND ESTIMATE FARM-LEVEL IMPACTS

A model was developed to estimate farm budgets under baseline conditions and each water buyback scenario in accordance with the three response pathways set out previously in Table 3. Farm budget models provide a

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16 For instance, additional complexity exists as it can be expected that some farms will have access to more favourable supply terms than others (for instance, due to purchase volumes), and may experience lower than average price increases as a result.

picture of the physical and financial performance of case study farms over time, allowing the impact of higher allocation prices resulting from water buybacks to be examined.

DFMP data for each farm were populated for each response pathway per the following categories:

- Physical information, including total production, water use, cows, farm area, home grown feed and purchased feed (quantity and prices)
- Total farm and non-farm income
- Total costs, comprised of herd, shed, feed, overhead, capital and finance costs
- Total asset value (including entitlements, livestock, land, current assets, plant and equipment, other farm assets).

This provided the baseline performance for each farm. A summary of the data categories used in modelling are contained in Appendix 1.

To undertake the analysis, key baseline variables were altered under each response pathway as shown previously in Table 3.

In the face of higher allocation prices under pathway A, farmers would choose to retain production per baseline levels, necessitating the purchase of any allocations at the higher prices implied by each buyback scenario.

Under pathway B, farmers do not purchase additional water allocations, with their total water use limited to allocations received plus inventory drawdown (where this is equal to or less than baseline total water use). Farmers substitute additional water allocation purchases for purchased feed such that total milk production equals that of the baseline.

Under pathway C, farmers cease the purchase of allocations and do not purchase additional feed beyond baseline levels. As with pathway B, total water use is limited to allocations received plus inventory drawdown (where this is equal to or less than baseline total water use). This has the effect of reducing costs and total output. Reductions in milk production were estimated by linking each farm's reduced water use (which included both allocation and inventory water use where applicable, with total use capped at baseline levels) to home-grown feed availability, using farm-specific water use efficiency values from DFMP data. The resulting feed volume was used to estimate the maximum supported herd size, based on that farm's feed requirements per cow for that year. Milk production was then calculated using that same farm's recorded milk output per cow in that year. This approach reflects a realistic, feed-limited adjustment in herd size and milk output under constrained water use, tailored to each farm's actual data and conditions.

The resulting impact on farm earnings before interest and taxes (EBIT) and operating costs was then derived under each response pathway to examine which of these would be most feasible for each farm in each given year.

This process was performed for each farm for all years data was available. This provided analytical outputs over varied seasonal conditions and allocation levels, as discussed below. This had the effect of altering the allocation prices to reflect seasonal conditions and the availability of water on the market. By doing so, the analysis was able to examine how different farms may alter their responses within these contexts.

### 3.5.1 Modelled years and prevailing seasonal conditions

Most case study farms provided DFMP data from 2016/17 to 2023/24 inclusive, with only two farms having gaps in reporting during this period.

Historic seasonal and allocation data was reviewed to categorise each year in this timeseries according to the prevailing seasonal conditions. 2019/20 was considered a 'dry' year, while others were considered to be more moderate. As was outlined in section 3.2.1.3, a sensitivity test was conducted to mimic the effects of an 'extreme dry' year to further examine the potential effects of highly adverse conditions upon dairy farms. This resulted in the inclusion of an additional year of data – an 'extreme dry' year – based on 2019/20 farm baseline data.

### 3.5.2 Outputs

The outputs of the farm-level impact analysis are, for each year and response pathway, the change in EBIT, operating costs and milk production relative to the baseline.

These outputs are presented below in section 4, and an analysis of results is presented in section 5.

### 3.5.3 Model parameters and assumptions

The key modelling assumptions and key parameters employed in this analysis are summarised in Table 4.

Table 4: Key model parameters and assumptions

| Parameter or assumption | Description |
|---|---|
| Prices | The model includes prices for various products including those relating to herd management, shed costs, revenues, overheads, feed and water costs. Prices are presented as nominal for the year indicated alongside each output. |
| Appraisal period | All outputs presented relate to a single year of production, as indicated. |
| Timing of buyback | Buyback is assumed to have occurred in full at the time of assessment. That is, the outputs assume the buyback has been implemented in full in each year of analysis. |

# 4. RESULTS

This section presents the change in EBIT and operating cost outputs for available timeseries data for each farm. These insights informed subsequent analysis on the potential reductions in milk production which may result at the broader industry level as a result of the buybacks.

Given the volume of output data (e.g. in excess of 500 outputs for changes to farm EBIT), results have been summarised to provide the most meaningful information.

## 4.1 CASE STUDY FARM RESULTS

The following sections summarise the change in EBIT (%), change in operating costs (%), and the range of impacts observed across each response pathway for the case study farms. [17] These results are not intended to suggest farms will adopt any one pathway but rather illustrate the possible consequences of different adaptation responses.

### 4.1.1 Case study farm results: Pathway A

Under Pathway A, farms sustained their milk production by purchasing water at baseline consumption levels at a higher price, due to the effects of buybacks upon water availability. Where case study farms had purchased entitlement (i.e. per the baseline DFMP data), this pathway resulted in higher operating costs due to increased water expenditure, with corresponding impacts on EBIT. This impact varied across farms depending on their level of water entitlement ownership, and therefore the amount of water purchased.

The financial impacts were assessed across the two water buyback scenarios.

#### *4.1.1.1 Impact on EBIT*

The average change in EBIT across all farms was -10% under the 302 GL (moderate) scenario and -19% under the 683 GL (high) scenario.

- The maximum change (loss) in EBIT recorded was -190% (302 GL) and -431% (683 GL). The impact of this in dollar terms varied significantly between farms and different years.
- The most impacted farms (e.g., Farm E, Farm G) saw EBIT reductions exceeding -168% to -431% in extreme years. For these farms, the impact in dollar terms was material, with Pathway A resulting in reductions in EBIT ranging from over $110,000 (302GL) and over $500,000 (683GL) in the “extreme dry” year. It is **highly likely** that under these conditions, such farms would pursue an alternate pathway (such as purchasing feed or reducing production) to minimise these significant costs.
- Other farms such as Farm A, Farm C, and Farm B experienced relatively milder reductions in EBIT, with their greatest changes (losses) in EBIT ranging from -5% to -22%, reflecting a relatively lower reliance on water purchases.
- The average loss in dollar terms for all farms in all years under the 302GL scenario was approx. $32,000, and the average maximum loss for all farms in their worst year was approx. $181,000.
- The average loss in dollar terms for all farms in all years under the 683GL scenario was approx. $53,000, and the average maximum loss for all farms in their worst year was almost $245,000.

These results indicate that while some farms experienced relatively small EBIT reductions, others, particularly those with higher water use and lower entitlement holdings, were impacted more severely.

#### *4.1.1.2 Impact on operating costs*

The average change (increase) in operating costs for the 302GL scenario was 1%, with a maximum increase of 7% observed. In the 683GL scenario, the average change in operating costs was slightly higher at 2%, with the maximum increase reaching 10% (Farm E).

- 302GL buyback scenario: The maximum increase in operating costs was 32%.

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[17] Note regarding the results in this section: Average % EBIT changes represent unweighted averages across farms, while average dollar changes reflect actual EBIT levels and are influenced by farm size. These two metrics provide complementary insights, as percentage changes highlight the relative impacts across all farms, while dollar values reflect the scale of financial impacts, particularly for larger enterprises.

- 683GL buyback scenario: The maximum increase in operating costs was 40%.

While the overall increase in operating costs was relatively small for most farms in percentage terms, a few farms saw larger cost increases.

Table 5: Pathway A, case study farm changes in EBIT and operating costs, 302GL scenario

| Farm | Average change in EBIT (%) (302GL) | Greatest change (loss) in EBIT (%) (302GL) | Lowest change (loss) in EBIT (%) (302GL) | Average change in operating costs (%) (302GL) | Minimum change (increase) in operating cost (%) (302GL) | Maximum change (increase) in operating cost (%) (302GL) |
|---|---|---|---|---|---|---|
| A | -2% | -10% | 0% | 0% | 0% | 1% |
| B | -1% | -9% | 0% | 0% | 0% | 1% |
| C | -1% | -5% | 0% | 0% | 0% | 1% |
| D | -3% | -9% | 0% | 1% | 0% | 4% |
| E | -32% | -168% | 0% | 2% | 0% | 10% |
| F | -7% | -25% | -1% | 1% | 0% | 2% |
| G | -34% | -190% | -1% | 3% | 0% | 15% |
| H | -7% | -36% | 0% | 1% | 0% | 3% |
| I [18] | 0% | 0% | 0% | 0% | 0% | 0% |
| J | -20% | -93% | -1% | 5% | 0% | 32% |
| K | -5% | -22% | 0% | 1% | 0% | 4% |
| Average across farms | **-10%** | **-51%** | **0%** | **1%** | **0%** | **7%** |
| Average dollar value impact ($) | **-$31,762.59** | **-$180,704.32** | **$0** | | | |

Table 6: Pathway A, case study farm changes in EBIT and operating costs, 683GL scenario

| Farm | Average change in EBIT (%) (683GL) | Greatest change (loss) in EBIT (%) (683GL) | Lowest change (loss) in EBIT (%) (683GL) | Average change in operating costs (%) (683GL) | Minimum change in operating cost (%) (683GL) | Maximum change in operating cost (%) (683GL) |
|---|---|---|---|---|---|---|
| A | -4% | -22% | 0% | 1% | 0% | 2% |
| B | -2% | -11% | 0% | 0% | 0% | 1% |
| C | -2% | -11% | 0% | 1% | 0% | 2% |
| D | -8% | -20% | 0% | 2% | 0% | 8% |
| E | -45% | -219% | 0% | 3% | 0% | 14% |
| F | -15% | -57% | -2% | 3% | 0% | 6% |
| G | -71% | -431% | -2% | 4% | 1% | 20% |
| H | -14% | -81% | 0% | 1% | 0% | 5% |

18 Farm I did not purchase allocation in any of the baseline DFMP data years. Therefore, it experienced no change in results under any response pathway.

| Farm | Average change in EBIT (%) (683GL) | Greatest change (loss) in EBIT (%) (683GL) | Lowest change (loss) in EBIT (%) (683GL) | Average change in operating costs (%) (683GL) | Minimum change in operating cost (%) (683GL) | Maximum change in operating cost (%) (683GL) |
|---|---|---|---|---|---|---|
| I | 0% | 0% | 0% | 0% | 0% | 0% |
| J | -34% | -116% | -1% | 8% | 1% | 40% |
| K | -11% | -49% | 0% | 2% | 0% | 8% |
| Average across farms | **-19%** | **-92%** | **0%** | **2%** | **0%** | **10%** |
| Average dollar value impact ($) | **-$52,591.24** | **-$244,729.28** | **$0** | | | |

### 4.1.2 Case study farm results: Pathway B

Under Pathway B, farms maintain their milk production by substituting additional purchased feed for additional purchased water allocations. That is, no additional water allocation purchases are made (as may have been the case under the baseline), but rather additional feed purchases are made to maintain the same level of production as under the baseline.

#### *4.1.2.1 Impact on EBIT*

The average change in EBIT across all farms under Pathway B was a reduction of -41%, reflecting a significant reduction in profitability due to the increased feed volume purchase costs.

- The maximum reduction in EBIT recorded was -535% (Farm A), while some farms actually increased their EBIT in some years, as demonstrated by a change of +41% for farm Farm G. This wide range indicates substantial variability across farms and years. The impact of this in dollar terms also varies significantly between farms and different years.
- The most impacted farms, such as Farm A and Farm F, experienced significant losses in EBIT, with reductions as severe as -253% to -535% in extreme years. For these farms, the impact in dollar terms was material, with Pathway B resulting in reductions in EBIT ranging from over $350,000 to over $430,000. It is **highly likely** that under these conditions, such farms would pursue an alternate pathway (such as purchasing allocation or reducing production) to minimise these significant costs.[19]
- Several farms experienced EBIT gains relative to the baseline, with increases ranging up to +41% from the baseline. These results suggest that for some farms, the substitution of allocation for purchased feed may reduce cost relative to the baseline and lead to improved EBIT outcomes.
- The average loss in dollar terms for all farms across all years under Pathway B was approximately $111,000, and the average maximum loss for all farms in their worst year was approx. $259,000.

These results demonstrate that while Pathway B generally leads to a decrease in EBIT for most farms, the level of impact is highly variable depending on entitlement ownership and farm cost structures.

#### *4.1.2.2 Impact on operating costs*

The average increase in operating costs for Pathway B was 6%, with the maximum observed increase reaching 23%.

[19] Note: The percentage changes in EBIT under extreme years reflect the combination of high water prices and individual farm cost structures. For farms with low baseline EBIT, even moderate dollar cost increases can translate into very large percentage impacts. These do not imply that total farm costs increased by comparable amounts. Actual cost exposure to water price changes varies depending on each farm's water purchases, entitlement holdings, and production model. These scenarios are intended to explore the potential range of impacts under defined assumptions, rather than predict typical outcomes.

- The maximum increase in operating costs was 38% (Farm F)
- The average increase in operating costs across all farms was 6%, with changes ranging from -6% to +38%.

Farms like Farm F and Farm A, which experienced the highest increases in operating costs, were most impacted financially due to their large reliance on purchased feed and the associated cost increases.

While operating costs increased for most farms under Pathway B, the impact was generally moderate, with a few farms experiencing significant cost increases.

Table 7: Pathway B, case study farm changes in EBIT and operating costs (relevant for both scenarios)

| Farm | Average change in EBIT (%) | Greatest change in EBIT (%) | Lowest change in EBIT (%) | Average change in operating costs (%) | Minimum change (increase) in operating cost (%) | Maximum change (increase) in operating cost (%) |
|---|---|---|---|---|---|---|
| A | -96% | -535% | 0% | 6% | 0% | 13% |
| B | -2% | -11% | 4% | 0% | -1% | 1% |
| C | -4% | -23% | 5% | 2% | -1% | 8% |
| D | -59% | -178% | 32% | 12% | -6% | 28% |
| E | 6% | -3% | 20% | 0% | -1% | 1% |
| F | -135% | -253% | -5% | 23% | 1% | 38% |
| G | -46% | -180% | 41% | 8% | -3% | 20% |
| H | 3% | -28% | 19% | 0% | -3% | 8% |
| I | 0% | 0% | 0% | 0% | 0% | 0% |
| J | -22% | -50% | 29% | 8% | -6% | 17% |
| K | -53% | -117% | 0% | 9% | 0% | 23% |
| Average across farms | **-37%** | **-125%** | **13%** | **6%** | **-2%** | **14%** |
| Average dollar value impact ($) | **-$111,381.38** | **-$259,360.22** | **$36,294.55** | | | |

### 4.1.3 Case study farm results: Pathway C

Under Pathway C, farms reduced their output, using only their allocated water and any inventory drawdown without purchasing additional water or feed beyond baseline levels. This approach led to a reduction in milk production. However, some farms offset these losses by selling surplus livestock. As a result, while many farms experienced a decline in EBIT, others saw an increase due to additional revenue from cattle sales in a given year. The following section summarises the changes in EBIT, operating costs, and the range of impacts observed across the case study farms.

#### *4.1.3.1 Impact on EBIT*

The average change in EBIT across all farms was a loss of -6%, though as with Pathways A and B, individual farm results varied significantly.

- The greatest change (reduction) in EBIT in a given year was -340% (Farm A), with other highly affected farms, such as Farm F, experiencing reductions of -90%. This wide range indicates substantial variability across farms and years. The impact of this in dollar terms also varies significantly between farms and different years.

- Several farms, including Farm E, Farm H, and Farm J, reported EBIT gains. Farm E had an EBIT increase of 18% on average across modelled years, with a maximum EBIT increase of 54% in a single year. Farm J saw a maximum increase of 183%. This suggests that for some farms, the revenue generated from cattle sales outweighed the financial losses from reduced milk production, although these figures are discrete in that they do not account for lost milk production revenues in future years as a result of livestock sales.
- The average EBIT loss across all farms was approx. $71,000, but the range of impacts was substantial, with farms gaining on average as much as $91,000 in their 'best' year.

These results demonstrate that Pathway C had highly variable financial impacts, dependent on the ability of farms to leverage livestock sales to offset lost milk revenue and operating costs.

#### *4.1.3.2 Impact on operating costs*

The average change in operating costs across all farms was a reduction of -7%, as lower milk production led to reduced costs associated with feed and water use.

- Farms such as Farm F and Farm A saw significant reductions in operating costs relative to the baseline of -13% and -5% respectively, reflecting the lower input requirements under reduced production.
- Farms such as Farm C saw slight reductions in operating costs (-3% on average), while others, such as Farm B recorded only marginal changes.
- The largest reduction in operating costs was -26% (Farm J), suggesting that in some cases, cost savings from reduced milk production were substantial.

Overall, the decrease in operating costs under Pathway C contributed to mitigating EBIT losses for some farms. However, cost reductions alone were not always sufficient to offset milk revenue losses, and for farms without significant livestock sales, EBIT remained negative.

Table 8: Pathway C, case study farm changes in EBIT and operating costs (relevant for both scenarios)

| Farm | Average change in EBIT (%) | Greatest change (loss) in EBIT (%) | Lowest change (loss) in EBIT (%) | Average change in operating costs (%) | Minimum change (increase) in operating cost (%) | Maximum change (increase) in operating cost (%) |
|---|---|---|---|---|---|---|
| A | -50% | -340% | 8% | -5% | -13% | 0% |
| B | -2% | -9% | 4% | -1% | -7% | 0% |
| C | 1% | -16% | 22% | -3% | -7% | 0% |
| D | 13% | -24% | 77% | -9% | -25% | -1% |
| E | 18% | 0% | 54% | -4% | -11% | 0% |
| F | -48% | -90% | -16% | -13% | -21% | -2% |
| G | 6% | -52% | 41% | -10% | -17% | -3% |
| H | 20% | -11% | 145% | -3% | -9% | 0% |
| I | 0% | 0% | 0% | 0% | 0% | 0% |
| J | 13% | -64% | 183% | -16% | -26% | -9% |
| K | -29% | -145% | 57% | -9% | -26% | 0% |
| Average across farms | **-5%** | **-68%** | **52%** | **-7%** | **-15%** | **-1%** |
| Average dollar value impact ($) | **-$70,788** | **-$273,559** | **$91,239** | | | |

#### *4.1.3.3 Impact on milk production*

Under Pathway C, farms rely solely on their water allocations (if any) and the volume of feed purchased in the baseline (if any) to enable milk production. As a result, herd sizes are often reduced, leading to lower milk production.

The average reduction in milk production across all farms and all years under Pathway C was 906,152 litres in a given year. However, there was significant variation between farms, with some experiencing much larger reductions than others.

- The highest reduction was -5.39 million litres (Farm J), representing a 75% decrease in its worst year. Other highly affected farms included Farm F (-1.17 million litres) and Farm G (-1.31 million litres).
- The smallest reduction in production was -41,035 litres (Farm E), a relatively small farm with high entitlement ownership.
- On average, farms saw a 21% reduction in milk production in any given year. Average minimum losses across the 'best' year for all farms was -8%, and the average maximum losses across the 'worst' year for all farms was -36%.
- Farms J (-55% average, -75% in the worst year) and Farm D (-43% average, -70% worst year) saw the largest percentage reductions. These farms have moderate to low water entitlement ownership respectively and therefore had a relatively limited ability to sustain production under reduced water availability.

These results indicate that, under Pathway C, some farms faced extreme reductions in milk production, while others managed to reduce production more moderately. Farms with lower entitlement holdings and a greater reliance on water-intensive systems were the most affected.

Table 9: Pathway C, case study farm changes in milk production (relevant for both scenarios)

| Farm | Average change in milk production (L) | Greatest change (loss) milk production (L) | Lowest change (loss) in milk production (L) | Average change in milk production (%) | Greatest change (loss) milk production (%) | Lowest change (loss) in milk production (%) |
|---|---|---|---|---|---|---|
| A | -1,308,047 | -1,898,182 | - | -19% | -31% | 0% |
| B | -411,521 | -1,661,142 | - | -2% | -11% | 0% |
| C | -115,687 | -409,636 | - | -6% | -21% | 0% |
| D | -351,179 | -508,594 | -224,240 | -43% | -70% | -25% |
| E | -41,035 | -220,070 | - | -5% | -16% | 0% |
| F | -823,162 | -1,168,786 | -525,346 | -45% | -63% | -28% |
| G | -758,846 | -1,309,527 | - | -20% | -36% | 0% |
| H | -111,482 | -449,158 | - | -5% | -19% | 0% |
| I | - | - | - | - | - | - |
| J | -4,311,658 | -5,385,081 | -2,060,146 | -55% | -75% | -34% |
| K | -828,905 | -1,676,302 | - | -27% | -55% | 0% |
| Average across farms | **-823,775** | **-1,335,134** | **-255,430** | **-21%** | **-36%** | **-8%** |

### 4.1.4 Summary of case study results

The financial and production impacts of water buybacks on dairy farms varied significantly across the three response pathways, with each pathway presenting different challenges and trade-offs. While all farms experienced financial impacts under at least one pathway, the extent of these impacts was influenced by farm characteristics, including water entitlement ownership, feeding systems, and reliance on allocation markets.

- Pathway A (purchasing the same amount of allocations at higher prices):
  - resulted in average EBIT reductions of -10% (302GL scenario) to -19% (683GL scenario), with the most affected farms experiencing EBIT losses exceeding -400% in extreme years. Farms with lower entitlement ownership bore the highest financial burden due to greater reliance on water purchases at higher prices.
  - Resulted in moderate operating cost increases, with an average increase of 1% (302GL) and 2% (683GL). The worst-affected farms faced cost increases of up to 40%, reflecting the direct impact of higher water prices.
- Pathway B (purchase feed instead of allocations to maintain production):
  - led to the most severe EBIT impacts overall, with an average EBIT reduction of -37%. The worst-affected farms recorded EBIT losses as high as -535% in certain years, reflecting the substantial cost of substituting feed for water. However, a few farms experienced small EBIT gains where the substitution of allocation for purchased feed may actually result in reduced costs.
  - had a larger average increase in operating costs (6%), with some farms experiencing increases as high as 38% due to feed costs. Farms with a greater reliance on purchased feed saw the largest increases in costs.
- Pathway C (reduce output, no additional allocation or feed purchases):
  - had the least consistent EBIT impact, with an average EBIT change of -5% but a wide range of results. Some farms recorded EBIT reductions exceeding -340%, while others experienced EBIT gains of up to 183%, driven by livestock sales compensating for lower milk production revenue.
  - resulted in a reduction in operating costs of -7% on average, as farms reduced their production levels. The largest reduction was -26%, reflecting the lower input costs associated with reduced milk production.
- Pathway C was the only response that led to a reduction in milk production, as farms did not purchase additional water or feed beyond baseline levels:
  - The average milk production loss per farm was -823,775 litres per year, or -21%.
  - The worst-affected farm (Farm J) recorded losses of -5.39 million litres, representing a 75% decline in production.
  - Farms with greater water entitlement ownership had smaller reductions, while those with limited entitlements saw more severe declines in milk production.

The results indicate that the financial impact of each pathway varied across farms and years, with no single response consistently leading to the lowest financial losses. While Pathway A generally had smaller percentage reductions in EBIT, the dollar impact was still significant for some farms with high water purchase needs. Pathway B often resulted in large EBIT reductions due to the cost of purchased feed, though some farms managed to offset this impact. Pathway C showed the greatest variability, as farms that could sell livestock sometimes improved EBIT, while others faced severe losses. In practice, farms facing substantial financial strain under one pathway **would likely adjust their strategy to minimise long-term impacts**, and some may be willing to absorb shorter-term losses to avoid herd reductions.

This analysis does not account for industry exit as a response pathway, which is explored qualitatively in the section 5. Analysis on the potential impacts of buyback upon total milk production is explored further in section 5.4.

# 5. ANALYSIS

The modelled financial and production outputs offer only simplified insights into real-world farm decision making. This is a consequence of the complexities of farm business management practices, contractual arrangements, and the need to consider long-term financial viability rather than that in any given year. This section firstly analyses the modelled financial results and potential implications for longer-term farm viability, followed by a discussion on the potential milk production impacts for the industry.

## 5.1 IMPACTS OF BUYBACK UPON FARM BUDGETS

The financial impacts of buybacks on dairy farms are highly variable, reflecting differences in entitlement ownership, production systems, and farm-level adaptability. Across all three response pathways, EBIT reductions were observed in most years, although the scale and nature of financial impacts varied significantly. While short-term EBIT results provide a snapshot of financial effects, longer-term sustainability depends on a farm's capacity to manage prolonged cost pressures, adapt to changing input costs, and make strategic adjustments over time.

It should be noted that while the case study farms show a wide range of financial impacts, these farms are drawn from the DFMP cohort, which may be skewed toward more efficient and well-managed businesses. As such, the analysis may understate the potential impacts of buybacks across the broader industry, which could be more severe for farms with lower management proficiency or adaptive capacity.

These impacts are also compounding long-term financial pressures in the dairy industry. Over the past two decades, many farms have experienced tightening margins, increased input costs, and declining equity positions. For some, the additional impact of buybacks may represent a tipping point after years of adjusting to difficult conditions.

By considering these nuanced considerations in the context of modelled outputs, the following insights are derived:

- **Short-term EBIT reductions may not fully capture negative impacts on long-term financial resilience**. Some farms appear more financially resilient under Pathway A (purchasing allocations at higher prices) or Pathway B (substituting purchased feed). However, these strategies may be unsustainable in the long run if high allocation or feed prices persist. A farm that maintains output despite declining profitability could face increasing financial stress over multiple years, eventually forcing a change in strategy.
- Under moderate conditions, farms may tolerate higher allocation prices rather than shifting strategies. When prevailing water allocation prices are relatively low, farmers are more likely to accept higher water costs rather than adjust their production systems. Those less able to modify their feeding systems may not be able to respond to price signals as rapidly, which in some cases may lead to reduced financial performance.
- **Farms with low water entitlement ownership face the highest risk.** Several farms with lower entitlement ownership experienced the most severe EBIT reductions. These businesses are particularly vulnerable in dry years when water prices are high, as they are forced to either absorb higher costs (Pathway A) or purchase substantial amounts of feed (Pathway B), both of which erode margins. Without adaptation or structural change, these farms face a higher likelihood of industry exit if conditions remain unfavourable, such as over a period of extended drought.
- Smaller farms with low entitlement ownership are at particular risk. Farm D is a smaller farm with relatively low entitlement ownership relative to its needs, and recorded net losses in four of the eight modelled years. In several years, it would have been three to four times better off reducing production rather than continuing under Pathway A or B. This highlights the financial strain faced by smaller, lower-entitlement farms, particularly in dry conditions where adaptation options are more limited.
- **Pathway C highlights the trade-off between production volume and financial stability.** The results indicate that some farms may increase EBIT under Pathway C by selling livestock, despite reductions in milk production. This suggests that in certain years, reducing herd size may be a rational short-term strategy to manage risk. However, this comes with longer-term risks, including incurring the cost of rebuilding herds in the face of reduced future revenues.
- **For some medium-sized farms, reducing production is only viable in extreme dry conditions.** Farm G, a medium-sized farm with moderate entitlement ownership, showed a benefit in several years of reducing production to maximise EBIT relative to other pathways. In most years, the farm would still generate strong EBIT under Pathway A, despite increased costs. However, in an extreme dry year, the farm would have been 3 to 10 times better off reducing production, highlighting the increasing trade-offs many farms will need to make in the face of drier conditions and rising allocation prices.
- **Larger, high-entitlement farms are unlikely to benefit from reducing production.** Farms with higher entitlement ownership, such as Farms B and I, rarely saw long-term financial benefits from reducing production. Even in extreme dry scenarios, reductions in herd size would result in only

marginal EBIT improvements, offset by future-year costs associated with rebuilding herds. For example, Farm B would have only been slightly better off by reducing production in the extreme dry hypothetical year, but this benefit would have been eroded by future herd rebuilding costs. This suggests that large, high-entitlement farms are more likely to persist with maintaining production, even under high allocation prices, rather than opt for herd size reductions.

- Farmers with higher entitlement ownership and greater financial resources are likely to be least affected. Farms with access to significant entitlement holdings and financial reserves were better positioned to absorb shocks. However, even these businesses may face financial stress under prolonged dry conditions, particularly if both allocation and feed prices rise simultaneously.
- **Some farms are likely to experience only minimal impacts as a result of buyback.** Farms with access to significant entitlement holdings and financial reserves were better positioned to absorb shocks. Farm I was unaffected by the buyback under any pathway, reinforcing the financial benefits of high entitlement ownership. It recorded 0% change in EBIT and operating costs across all pathways, as its high entitlement ownership ensured that it received sufficient allocations to meet (and exceed) all its annual water needs. Unlike other farms, Farm I was insulated from water market fluctuations, demonstrating the buffering effect of high entitlement ownership in shielding farms from external shocks. However, farms in similar positions may still weigh the opportunity cost of holding excess entitlement, particularly if buybacks offer a premium to encourage sales. In addition, the model did not explicitly account for broader price shifts in purchased feed, beyond the assumptions regarding additional purchases under Pathway B. In reality, even farms with high entitlement ownership that purchase a portion of their feed may still face increased feed costs due to rising water prices, higher demand for feed, and drought conditions, all of which could place additional financial pressure on operating margins.
- **Financial resilience depends on a farm's ability to adapt over time.** While adopting Pathway A and B may allow farms with low entitlement ownership to maintain production in the short term, prolonged cost pressures will likely force adaptive decision making. A farm initially purchasing allocations at higher prices (Pathway A) may later shift to feed substitution (Pathway B) or production reduction (Pathway C) if cost increases become unsustainable. Farms experiencing prolonged losses will be more likely to exit the industry (refer to section 5.2).
- **Persistent financial pressure could force structural changes.** While some farms can manage short-term EBIT losses, those facing multiple years of declining profitability will likely need to restructure, reduce production, or exit. Six of the 11 case study farms recorded net losses in at least one year, and two farms recorded losses in two or more years, suggesting that prolonged financial pressure could drive structural shifts in the sector. For the worst-affected farm (Farm D), which already faced baseline EBIT losses in four of the modelled years, buybacks exacerbated these losses under Pathway A. In the 302GL scenario, EBIT reductions worsened by up to 9% in its worst-affected year, while in the 683GL scenario, EBIT fell by up to 20% relative to the baseline. This indicates that for farms already under financial strain, even modest increases in costs due to buybacks can substantially worsen profitability, particularly in dry years.

## 5.2 IMPLICATIONS FOR INDUSTRY EXIT

The extent to which water buybacks may drive industry exit is influenced by multiple factors, including farm size, entitlement ownership, reliance on purchased allocation or feed, and broader financial resilience. While some farms may be able to adapt, others already under financial strain be more likely to exit the industry over time.

### 5.2.1 Pathways to industry exit

Farms may exit the industry through two key pathways:

1. Direct exit through buyback participation: Some farmers, particularly those nearing retirement or those facing persistent financial pressure, may view buybacks as a viable exit strategy. The ability to sell entitlements at a premium could provide an attractive transition opportunity, particularly for farms that lack the scale or financial reserves to withstand rising costs. In these cases, industry exit is a deliberate decision.

2. Delayed exit due to prolonged (or anticipated) financial strain: For other farms, buybacks may not trigger an immediate exit but rather contribute to progressive financial decline. Over time, rising costs (particularly if compounded by extended drought) reduce financial resilience, and some farms will exit the industry by necessity. Others may choose to exit earlier in anticipation of long-term financial strain, opting to leave before the full impact is felt.

### 5.2.2 Drivers of industry exit

The likelihood of industry exit is influenced by a combination of financial, structural, and personal factors:

- Production scale: Smaller farms with fewer cows and lower milk production volumes may struggle to compete with larger, more efficient operations, especially when facing higher water prices and other operational costs. These farms typically have fewer financial buffers, making them more vulnerable to prolonged cost pressures.
- Entitlement ownership: Water entitlement ownership is a key determinant of farm resilience. Farms with high entitlement holdings (e.g., Farm I) are better insulated from rising allocation prices and may be less inclined to sell their entitlements. Farms with low entitlement ownership face greater risk, as they are more exposed to price volatility in the allocation market. Some may opt to sell their entitlements to secure a premium, particularly if they are already under financial strain.
- Feeding system and farm infrastructure: Farms heavily reliant on purchased allocation or feed will be more exposed to price fluctuations, which could exacerbate the financial pressures faced during periods of extended drought. Case study results indicate that farms with low entitlement ownership were most impacted under Pathway A and Pathway B.
- Farmer demographics: Farmer age and proximity to retirement can also influence the decision to exit the industry. These farmers could view the buybacks as an opportunity to bring forward their planned retirement if they can secure a reasonable premium on their entitlement. These decisions may reflect a desire to reduce ongoing risks or simply the opportunity to capitalise on a favourable offer. Such a decision is a highly personal one and will depend on a variety of other factors relating to personal and family circumstances which are not able to be reliably modelled.

The actual response of dairy farmers to buyback remains uncertain, and comprehensive data on the extent to which dairy farmers may engage with this option is not yet available. This may be a future avenue for analysis following the next round of buyback to determine the extent to which any farmers have chosen to sell their entitlements as part of the program.

The extent of industry exit as a direct or indirect result of buyback is likely to influence total milk production. It is unlikely that sold farms would be purchased by new owners to continue dairy farming. The land is more likely to be repurposed for alternative activities such as almond cropping, which are less water-intensive and therefore offer relatively better margins in comparison with dairy farming. This shift in land use would contribute to a reduction in total milk production, leading to flow-on effects for processors and regional economies. Industry exit would not only affect individual producers but also has broader implications for the supply chain, potentially exacerbating existing challenges in meeting domestic demand for dairy products.

## 5.3 REDUCED DAIRY WATER USE COMPARISON WITH ABARES

ABARES' modelling[20] does not provide explicit estimates of dairy water use reductions under different buyback scenarios. However, by using the values it provides for pastures (grazing) as a proxy and analysing regional water use declines in Northern Victoria and the Murray regions, the potential impacts on dairy irrigation can be estimated.

According to the ABS[21], the MDB accounted for 62% of Australia's total irrigation water use (or 4.9 million ML) in 2021. Within the MDB, 740,600 ML were used for pastures and cereals for grazing, which includes water for both dairy and other livestock. The data doesn't disaggregate water use between these uses, however, dairy farming is a significant irrigated industry in the sMDB, and in the absence of specific data, a **conservative**

[20] ABARES, 2024. The impacts of further water recovery in the southern Murray-Darling Basin.
[21] Australian Bureau of Statistics, 2022. Water Use on Australian Farms

**estimate is that dairy farming accounts for approximately 50% of the irrigation water used for pastures and cereals for grazing in the MDB**. This estimate acknowledges dairy farming's substantial reliance on irrigated pastures while recognising that other livestock operations also utilise this water resource.

Applying this proportion to ABARES' modelled water use reductions provides an estimate of the reduction for dairy under each buyback scenario, as shown in Table 10.

Table 10: Estimated dairy water use reductions based on ABARES modelling

| ABARES buyback scenario | Total water use reduction (pastures grazing) (GL) | Estimated dairy water use reduction (GL) | Estimated dairy water use reduction (%) |
|---|---|---|---|
| 125GL | 23.19 | 11.60 | 3.18% |
| 225GL | 42.49 | 21.25 | 5.82% |
| 325GL | 58.08 | 29.04 | 7.96% |

This shows that dairy water use declines with increasing buyback volumes, with reductions ranging from 11.6 GL (-3.18%) under ABARES' 125 GL buyback scenario to 29.04 GL (-7.96%) under the 325 GL scenario. Northern Victoria is the most affected region, experiencing 3.09% to 7.79% reductions in total water use across the scenarios. The 225 GL scenario suggests a 21.25 GL (-5.82%) decline in dairy irrigation, potentially impacting pasture availability, increasing reliance on purchased feed, or leading to herd size reductions. The 325 GL scenario presents results in 8% reduction in dairy water use.

To extend ABARES' findings to the 302GL and 683GL buyback scenarios, a linear relationship between buyback volume and pastures grazing water reductions is assumed for simplicity and analytical consistency. While ABARES' modelling suggests a logarithmic relationship, the changes between the 125GL, 225GL, and 325GL scenarios appear approximately linear. This assumption allows for a straightforward extrapolation while aligning with other components of this analysis, such as price effects modelling.

Using this approach, we estimate that:

- Under the 302GL scenario, dairy water use would decline by 27.06GL (-7.41%).
- Under the 683GL scenario, dairy water use would decline by 60.27GL (-16.51%).

These estimates provide insight into the potential scale of reductions in water availability for dairy farms under higher buyback volumes and are summarised in Table 11 below.

Table 11: Estimated dairy water use reductions under 302GL and 683GL buyback scenarios, based on ABARES modelling

| Ricardo buyback scenario | Total water use reduction (pastures grazing) (GL) | Estimated dairy water use reduction (GL) | Estimated dairy water use reduction (%) |
|---|---|---|---|
| 302GL | 54.11 | 27.06 | 7.41% |
| 683GL | 120.53 | 60.27 | 16.51% |

## 5.4 IMPLICATIONS FOR CHANGE IN MILK SUPPLY

It is reasonable to expect that milk production in the sMDB will decline to some extent, over some period of time as a result of water buybacks. Quantifying the extent of this impact is complex, given the diversity of farms in the sMDB and the uncertainty regarding which farms will reduce production, exit the industry altogether, or adapt their operations to be less reliant on irrigation water.

The scale of future buybacks also remains unknown, making it difficult to predict how many farms will be affected and to what extent. Some farms may choose to sell water entitlements and transition to less water-intensive operations, while others may continue to operate but at reduced levels of production. The timing of these changes is also uncertain, with some impacts occurring immediately and others unfolding over multiple years.

To assess the potential reduction in milk production, two complementary approaches have been used:

- **Approach A** applies a scenario-based method, estimating milk production losses based on different farm responses to buybacks, including adaptation, herd reductions, and industry exit.
- **Approach B** uses ABARES' analysis of reductions in dairy water use under different buyback scenarios and applies a conversion factor to estimate the corresponding decline in milk output.


## Summary of findings: potential reduction in milk production

Both approaches indicate that water buybacks will reduce milk production in the sMDB, but the scale of impact depends on how farms respond.

Approach A estimates that **milk production could decline by 60 to 270 million litres per year**, depending on the size of the buyback, the extent of industry adaptation, herd reductions, and farm exits. This equates to a **3% to 15% reduction in total sMDB production**.

Approach B suggests lower impacts, with **estimated losses of 40 to 211 million litres per year**, or a **2% to 11% reduction in total sMDB production**.

Both approaches highlight that the scale of milk production losses will ultimately depend on the extent of buyback, how many farms exit, the extent of herd reductions, and the ability of the industry to adapt through feed substitution and improved water efficiency.


### 5.4.1 Estimate of total sMDB milk reduction: Approach A (farm response scenarios)

The analysis presented in section 5.1 demonstrates that farms will avoid reducing herd sizes (and therefore milk production) where possible. Farms with a higher extent of entitlement ownership relative to their water needs will rarely choose to reduce production, all else being equal. Other farms, such as those with low to moderate entitlement ownership, may reduce production only following a period of extended drought. However, it is likely that there will be a proportion of farms choosing to reduce production or to exit the industry altogether in the face of buybacks, extended drought, or both. Given this uncertainty regarding potential farm responses, estimating the potential reduction in total milk production impacts requires a structured scenario-based approach.

To estimate the potential reduction in milk production, Approach A applies a scenario-based approach that considers different farm responses to buybacks. This approach accounts for the fact that not all farms will take the most extreme responses of reducing herd size (Pathway C) or exiting the industry entirely. To develop realistic estimates of potential reductions in milk production at the broader sMDB level, we consider three plausible industry response scenarios reflecting different levels of adaptation, herd reduction, and industry exit. These scenarios are based on assumptions about the proportion of farms adopting each pathway, as shown in Table 12.

Table 12: Milk production reduction scenarios based on assumed farm responses

| Scenario | Farms choosing Pathway A (buy water at higher prices) | Farms choosing Pathway B (substitute for purchased feed) | Farms choosing Pathway C (reduce production) | Farms exiting the industry |
|---|---|---|---|---|
| Scenario 1: Lower-impact response (more adaptation) | 55% | 35% | 8% | 2% |
| Scenario 2: Central response (moderate adaptation and exit) | 45% | 35% | 12% | 8% |
| Scenario 3: Higher-impact response (greater | 40% | 30% | 18% | 12% |

| Scenario | Farms choosing Pathway A (buy water at higher prices) | Farms choosing Pathway B (substitute for purchased feed) | Farms choosing Pathway C (reduce production) | Farms exiting the industry |
|---|---|---|---|---|
| production loss & exit) | | | | |

Scenario 1 assumes a more financially resilient industry where most farms adapt without major production declines. Scenario 2 assumes a balanced mix of adaptation, production reduction, and some industry exit. Scenario 3 assumes a more severe impact, with a greater number of farms reducing production or exiting the industry.

The methodology employed to estimate the total potential reduction in milk production at the industry level was as follows:

1. Approximate the number of milking cows in the sMDB (refer to Box 3 below)
2. Approximate the affected milking cows by response pathway: Apply the percentage of farms in Pathway C and industry exit to the total sMDB milking cow population.
    a. Pathway C: Partial milk production loss per cow, based on observed Pathway C impacts.
    b. Industry exit: Complete milk production loss, as all cows from exiting farms are removed from production.
3. Estimate the per-cow milk loss in Pathway C: Apply modelled case study results to estimate the average milk reduction per cow.
4. Apply the scenario proportions: Multiply the estimated per-cow milk loss by the number of cows assumed to be in Pathway C under each scenario.
5. Sum Pathway C and D impacts: Combine total milk reductions from Pathway C with the full milk production loss from farms exiting the industry.

### Box 3: Estimating the number of milking cows in the sMDB

We can estimate the potential impact of water buybacks on aggregate milk production by considering the total milking cow population and the potential reduction in milk production per cow due to buybacks. To do this, we first need to determine the number of dairy farms in the sMDB and their average herd sizes, allowing us to estimate the total milking herd in the region.

Dairy Australia estimated[22] that the Murray region – which comprises northern Victoria and southern New South Wales and represents the majority of the sMDB – was home to 860 dairy farms in 2023. South Australia had a total of 180 dairy farms, and as a portion of these are expected to be located outside of the MDB, we assume that approximately half of these are located within the Basin catchment relying on Murray River water. For the purposes of this analysis, this implies that there are approximately 950 dairy farms located in the sMDB.

The total number of dairy cows in the sMDB can be estimated using average herd sizes for each region, as provided by Dairy Australia:

- Murray region: 860 farms × 280 cows per farm = 241,000 cows
- South Australian sMDB (estimate): 90 farms × 350 cows per farm = 31,500 cows
- **Total estimated dairy cows in the sMDB: 272,500 cows**

22 Dairy Australia, 2023. Our regions. This estimate has been validated with Dairy Australia milk production per LGA data.

The estimated **annual milk production in the sMDB from these farms is estimated to be approximately 1.85 billion litres per year.** [23] Dairy Australia estimates total national milk production to be approximately 8.12 billion litres per year, which implies that the Murray region alone contributes 19.8% of Australia's total milk production. If we assume SA's sMDB farms contribute 0.237 billion litres, the total sMDB contribution is approximately 22.8% of national production.

For Pathway C, the estimated milk loss per cow was derived from the modelled case study farm results. The analysis showed that farms reducing herd sizes (Pathway C) experienced an average milk loss of 1,120.7 litres per cow per year, calculated across the total milking herd. This figure was applied to the proportion of cows assumed to be in Pathway C under each scenario.

Where farms exit the industry, it was assumed that all associated milk production would be lost. Given an estimated total milking cow population in the sMDB of 272,500 cows (refer to Box 3), the percentage of industry exits in each scenario was applied to this proportion of cows to estimate the total loss from industry exit. To calculate total milk production loss, we assumed an average annual milk production per cow of 6,569 litres, based on Dairy Australia estimates. [24]

The estimated annual milk production losses under each milk reduction scenario are shown in Table 13.

Table 13: Milk production reduction estimates under Approach A

| Milk reduction scenario | Milk reduction under Pathway C (million litres/ p.a.) | Milk reduction industry exit (million litres/ p.a.) | Total milk reduction (million litres/ p.a.) | Reduction as % of sMDB milk production | Reduction as % of National milk production |
|---|---|---|---|---|---|
| Scenario 1: Lower-impact response (more adaptation) | 24.43 | 35.8 | 60.23 | 3.36% | 0.74% |
| Scenario 2: Central response (moderate adaptation and exit) | 36.65 | 143.2 | 179.85 | 10.05% | 2.21% |
| Scenario 3: Higher-impact response (greater production loss & exit) | 54.97 | 214.81 | 269.78 | 15.07% | 3.32% |

Based on estimated milk production losses per cow under each scenario and a total milking cow population of 272,500 cows, the projected total milk reduction ranges from 60.23 million litres per annum (milk reduction scenario 1) to 269.78 million litres per annum (milk reduction scenario 3).

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[23] Dairy Australia, 2023. Our regions. The Murray region produces approximately 1.609 billion litres of milk per year. South Australia's dairy farms produce a total of 0.474 billion litres per year, though not all are within the sMDB. Assuming 50% of SA's dairy production comes from the sMDB, the estimated contribution is ~0.237 billion litres per year.

[24] Dairy Australia, 2024. In Focus 2024: The Australian Dairy Industry. Table 4 (apply the average annual milk production per cow in Victoria)

This represents a 3.36% to 15.07% decline in total sMDB milk production and a 0.74% to 3.32% reduction in Australia's total milk supply. The central estimate suggests a reduction of 179.85 million litres annually, equivalent to 10.05% of total sMDB production and 2.21% of national production.

These results highlight the significant potential impact of water buybacks on the dairy industry in the sMDB. The scale of production loss will ultimately depend on the extent of buybacks, regional water availability, and farm adaptation strategies.

### 5.4.2 Estimate of total sMDB milk reduction: Approach B (extrapolation based on ABARES' water use reduction estimates)

Approach A provides a ranged estimate on the potential reductions in sMDB milk production as a result of buybacks. This estimate establishes lower, central and upper estimates of milk production loss per cow to derive an sMDB-wide estimate of potential milk production losses as a result of buybacks. However, another approach to estimating potential milk supply reductions is to use a conversion factor that relates reductions in dairy water use to expected declines in milk production.

#### Box 4: Estimating an appropriate water to milk conversion factor

Estimating the impact of reduced water availability on milk production requires a robust irrigation water-to-milk conversion factor that accounts (as much as possible) for variations in farming systems, irrigation efficiency, and regional differences in dairy production. Given differences in water use efficiency across different farm types, several sources were reviewed to determine an appropriate estimate.

- RMCG (2019)[25] provides information on historical dairy water use efficiency, indicating that traditional irrigated dairy systems in the Basin typically produced between 1,500 and 2,000 litres of milk per ML of water used. It notes that more intensive farming systems (i.e. those incorporating barn based feeding and irrigated maize silage), can achieve significantly higher water-use efficiency, reaching up to 4,000 litres of milk per ML.
- Dairy Australia provides a benchmark of 1,200 litres of milk per ML for conventional pasture-based dairy systems in 2010, however, there is evidence of substantial efficiency gains over the past decade.[26] One example is a high-efficiency confined dairy system in Forbes, New South Wales, where a fully housed, total mixed ration system reportedly achieved 7,500 litres of milk per ML.
- An Australian Dairy Industry Council (2019)[27] submission to the ACCC Water Markets Inquiry supports the argument that Australian dairy farms, particularly those in the sMDB, have improved their water productivity significantly over the past 20 years. This reflects shifts towards better irrigation management and increasing use of supplementary feed systems to reduce reliance on irrigation.

While older estimates of water use efficiency suggest 1,500-2,000 L of milk per ML, modern intensive systems can achieve 4,000-7,500 L per ML. Most sMDB farms operate in a mixed system, combining irrigated pasture with supplementary feeding. So, to reflect the diversity of farming systems in the sMDB, a conversion factor of **3,500 litres of milk per ML of water used** has been adopted for the purpose of this analysis. This sits within the observed range of modern irrigation efficiencies and also acknowledges the ongoing variation in productivity between farms. This approach provides an indicative estimate of milk production reductions using an average conversion factor. It does not reflect marginal water productivity or capture nonlinear responses to reduced water use. Actual outcomes will vary based on farm system, seasonal conditions, and feed substitution practices.

ABARES' modelling does not explicitly estimate milk production impacts, but it does provide projections of reductions in pastures (grazing) water use, a category that includes dairy. Based on assumptions outlined in Section 5.3, reductions in dairy water use for the 125 GL, 225 GL, and 325 GL buyback scenarios were estimated at 11.60 GL, 21.25 GL, and 29.04 GL, respectively. Extrapolating these estimates to the 302 GL and 683 GL scenarios, dairy water use is projected to decline by 27.06 GL and 60.27 GL, respectively.

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25 RMCG, 2019. "It's not all about almonds" Background on issues affecting the "Connected Murray" system.

26 Milkrite, 2019, Silver lining as confined housing pays off for NSW dairy couple

27 Australian Dairy Industry Council, 2019. ADIC Submission: ACCC Murray-Darling Basin Water Markets Inquiry

Applying the 3,500 litres of milk per ML of water used conversion factor (see Box 4), the estimated milk production reductions are shown in Table 14.

Table 14: Milk production reduction estimates under Approach B

| Buyback scenario | Estimated dairy water use reduction (GL) | Estimated milk production reduction (million litres/p.a.) | Reduction as % of sMDB milk production [28] | Reduction as % of National milk production |
|---|---|---|---|---|
| 125GL (ABARES) | 11.60 | 40.6 | 2.20% | 0.50% |
| 225GL (ABARES) | 21.25 | 74.38 | 4.02% | 0.92% |
| 325GL (ABARES) | 29.04 | 101.64 | 5.49% | 1.25% |
| 302GL (Ricardo) | 27.06 | 94.71 | 5.12% | 1.17% |
| 683GL (Ricardo) | 60.27 | 210.95 | 11.41% | 2.60% |

These results indicate that reductions in dairy water availability could lead to substantial declines in milk production in the sMDB. Under the 125 GL buyback scenario, total milk production is estimated to decline by approximately 40.6 million litres per year, representing a 2.2% reduction in sMDB production and a 0.5% reduction in total national production.

Under the largest buyback scenario (683 GL), milk production could decline by 210.9 million litres per year, representing an 11.4% reduction in sMDB production and a 2.6% reduction in national production.

These estimates provide a water-use-based perspective on milk production losses, offering an alternative method of quantification to the case-study approach in section 5.4.1. Notably, this analysis suggests a lower total milk loss compared to the farm response-based estimates.

This may reflect several factors:

- The assumption of an average conversion factor across all farms, while actual efficiency levels vary significantly.
- The potential for farms to substitute feed or improve irrigation efficiency, reducing direct impacts on milk yield.
- The limitations of extrapolating from a generalised water use category (pastures grazing), which includes non-dairy livestock activities.

Overall, the findings from both milk reduction quantification approaches reinforce that increasing buyback volumes are likely to reduce milk production in the sMDB and nationally, but the extent of losses will depend on how individual farms adjust to reduced water availability.

# 6. LIMITATIONS

This analysis is subject to several data constraints, modelling assumptions, and scope limitations, which should be considered when interpreting the results.

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[28] Dairy Australia, 2023. Our regions. The Murray region produces approximately 1.609 billion litres of milk per year. South Australia's dairy farms produce a total of 0.474 billion litres per year, though not all are within the sMDB. Assuming 50% of SA's dairy production comes from the sMDB, the estimated contribution is ~0.237 billion litres per year. Dairy Australia estimates total national milk production to be approximately 8.12 billion litres per year.

- Modelled case study outputs may not be typical of the sMDB Dairy industry as a whole, as the reported individual farm circumstances in any given year may not reflect the ‘typical’ experience of a similar farm (in terms of business size or entitlement ownership). The analysis is based on 11 case study farms drawn from the DFMP dataset. While this is a small sample relative to the total sMDB dairy population (approx. 950 farms), it includes a mix of farm sizes, entitlement holdings, and feeding systems. However, the sample is not statistically representative, and caution is needed when generalising results. This limitation reflects the available dataset and permissions, and the findings are intended to illustrate possible impacts under different farm responses, not to quantify outcomes across the whole sector.
- By taking a case study approach, the analysis does not include all available data across the industry in the MDB. The case study approach was necessitated due to confidentiality concerns and other factors, including the relatively limited number of farms participating in the DFMP.
- The smaller sample size reduces the diversity of farm businesses able to be analysed. The result is that outputs are less readily able to be used to draw industry-wide conclusions regarding the impact of buyback and potential farm responses.
- It is also important to note that the farms participating in the DFMP are more likely to be among the more technically and financially proficient in the industry. Therefore, the findings of this analysis could potentially understate the severity of impacts for the broader dairy industry. Many farms outside the DFMP cohort may have less capacity to adapt to allocation price shocks due to differences in management practices, forward planning capability, and overall business resilience.
- No suitable farms within the South Australian sMDB catchment participate in the DFMP, and South Australia was therefore unable to be included within the analysis.
- Potential differences in reporting approaches between farms within the DFMP source data may introduce inconsistencies in the model. These differences may occur for various reasons. Where considered practical and beneficial, assumptions were developed to ensure such discrepancies did not materially affect the accuracy of outputs. Key differences identified include:
    - In some instances, the values reported for ‘total water use’ do not equal the sum of water allocations, allocation purchases and change in inventory. This is likely due to farms utilising other sources such as groundwater or reclaimed urban wastewater.
    - In some instances, the cost of purchased feed (e.g. fodder) does not equate to the reported price per tonne multiplied by the purchased volume. This may reflect favourable supply contracts that similar farms are not able to access (e.g. lower cost of purchased feed than typical, variation in livestock trade prices), and/or different approaches to reporting and record keeping (i.e. no costs recorded for water or feed purchases which did occur, etc).
    - An ability to draw down from water inventory and/or to avoid water purchases, despite lower entitlement ownership.
- DFMP data on prices paid by farms for water allocation purchases does not reflect the timing of purchases, and therefore the variations in the prices paid over the course of a given year. Price analysis would typically be conducted using volume-weighted monthly average prices to maximise accuracy, however, this approach was not possible with the available information.
- The modelling assumes that water buyback and their associated price impacts are distributed uniformly across the sMDB. This means that reductions in water use and price changes are treated as evenly spread throughout the region, without considering regional differences in water value or demand. In reality, the effects of buybacks are likely to be concentrated in areas where water is most intensively used or in higher demand, leading to more localised price impacts. Due to the complexity of accounting for these regional variations, they were not included in the analysis. This approach was taken to simplify the modelling process and avoid the need for detailed projections of how water purchases and price effects would differ across regions.
- The analysis does not account for the complexity of fixed infrastructure charges that may continue to apply even when land is no longer actively irrigated. In particular, the separation of land and water rights means that new landholders may inherit delivery infrastructure charges without holding water entitlements or intending to irrigate. These structural cost burdens are not explicitly modelled in this analysis, but may contribute to financial stress and reduce farm viability.

- The analysis does not explicitly consider the likely effects of future climate change impacts upon dairy farms. Modelling utilises historical farm performance data which reflects past climate variability rather than projected future conditions. However, climate change is expected to increase the frequency and severity of dry conditions and reduce water availability in and around the sMDB over time. This will likely exacerbate the financial and operational impacts of water buybacks on dairy farms. In turn, these compounded pressures are likely to amplify flow-on effects to processors, input suppliers, and regional communities.
- Ricardo did not review the validity of the methodology or analysis or the veracity of the findings from any existing literature referred to in this report. The purpose of this report was not to evaluate the robustness of previous studies.
- Ricardo has not assessed whether there is a net benefit to society in recovering the additional water (i.e. whether the environmental and other benefits exceed the costs).

# PART B: IMPACT OF BUYBACK ON DAIRY PROCESSORS

## 7. INTRODUCTION

The Australian dairy industry is a critical component of the Basin economy, supporting thousands of jobs and contributing significantly to Australia's domestic and export supply of milk and dairy products. [29] However, the sector is facing a variety of challenges, which are expected to be further impacted by the Commonwealth's water entitlement purchases (buybacks).

As assessed in Part A, buybacks are likely to further reduce the availability of irrigation water and increase the cost of allocation purchases. This has the potential to increase the cost of dairy farming, accelerate the decline in raw milk production, and result in cascading effects on the ongoing viability of dairy processors within and outside the region.

Part A of this report explored the farm-level impacts, including financial pressures, farm exits, and raw milk production declines. Part B shifts the focus to dairy processors, evaluating how higher costs of farmgate production and reduced milk supply in the sMDB affects dairy processors throughout the MDB and surrounding regions, and may impact upon their ongoing viability.

The findings are based on a combination of qualitative and quantitative analysis, including stakeholder interviews with dairy processors, transport operators, and industry representatives, as well as secondary research from industry reports, economic data, and policy documents.

**Box 5: Purpose of this analysis**

The purpose of this report is to provide an evidence-based assessment of how water buybacks may impact the dairy processing sector. Reduced raw milk supply is expected to have flow on effects beyond the sMDB, particularly in other key dairy regions of Victoria and interstate supply chains. Specifically, it aims to:

- Examine the direct impacts of reduced raw milk supply on dairy processors, including changes in production capacity, plant viability, and operational costs.
- Analyse the implications for dairy supply chains, including transport logistics, milk movement across regions, and the potential for increased costs and inefficiencies.
- Evaluate how market dynamics may shift, including changes in industry structure, pricing pressures, and the potential for increased reliance on imported dairy products.
- Provide insights for policymakers and industry stakeholders, helping inform discussions on industry support measures, water policy, and long-term dairy sector sustainability.

By drawing on first-hand industry insights this report builds on the findings of Part A, translating farm-level impacts into implications for dairy processors. This analysis is essential for shaping future strategies, ensuring that policy decisions consider the long-term viability of the Australian dairy processing sector.

## 8. APPROACH

This analysis was conducted using a mixed-method approach that integrates industry engagement, desktop research, and data analysis to assess the potential impacts of buybacks on dairy processors in the MDB. The approach was designed to provide a strategic assessment of supply chain dynamics, economic implications, and potential industry adjustments in response to declining milk availability.

The approach consisted of the following key steps:

1. **Drawing relevant insights from the farm-level impact assessment (from Part A) as a foundation**

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29 Dairy Australia, 2023. Dairy in the Basin, pg. 5.

- Part A quantified potential reductions in raw milk production under different buyback scenarios.
- It explored likely farm responses, including farmers absorbing higher input cost, herd reductions and the potential for reduced raw milk production (under Pathway C).
- These insights formed the basis for estimating the raw milk supply reductions that processors may face.

2. **Stakeholder engagement with dairy processors and transport operators**
   - Interviews were conducted with primary and secondary processors and a dairy transport service provider.
   - These discussions provided insights into the potential impacts of buyback upon processor viability, plant utilisation, milk sourcing strategies, cost pressures, and potential adaptation approaches.
3. **Review of economic data and industry reports**
   - Analysis of research from Dairy Australia, the Australian Dairy Products Federation (ADPF), and government bodies (e.g. ABARES, ABS) was undertaken.
   - Key industry structures and supply chain linkages were identified through mapping of processor locations and review of historic trends.
4. **Scenario analysis to quantify processing sector impacts**
   - The estimated raw milk supply reductions from Part A were applied to processing sector outputs.
   - Potential reductions in processed dairy products were then estimated. This enabled quantification of the potential foregone value of processed dairy products as a result of buybacks.
5. **Integration of qualitative and quantitative findings**
   - Insights from industry engagement, the farm-level analysis in Part A, and other economic data were combined to assess potential impacts on processor viability in tandem.
   - The analysis examined financial and operational pressures on processors, potential shifts in milk flows, and broader industry restructuring, providing a more complete picture of how buybacks may shape the dairy processing sector.

# 9. THE SMDB DAIRY PROCESSING SECTOR

The dairy processing sector in the sMDB plays a critical role in Australia's dairy supply chain, supporting regional economies, employment, and domestic and export markets. This section provides an overview of the industry structure and geographic distribution of dairy processing facilities, the economic contribution and scale of dairy processing in the region, and the existing pressures that processors face due to declining raw milk supply, rising costs, and market competition.

## 9.1 INDUSTRY STRUCTURE AND GEOGRAPHY

The sMDB is a major milk-producing region, supplying dairy processors located both within and outside the Basin. The region's irrigated dairy farms have historically supported a stable milk supply, which has been essential for processors operating in Victoria, South Australia, New South Wales, and beyond. While some dairy processing facilities are situated within the sMDB, a significant proportion of the milk produced in the region is transported to processing plants located elsewhere to meet domestic and export market demands.

The sector comprises a mix of multinational corporations, domestic processors, and smaller, independent operators, each with varying degrees of reliance on milk from the sMDB. Some processors source the majority of their supply from the Basin, while others draw from multiple regions, using the sMDB as one component of their broader milk supply strategy. Production is focused on a range of dairy products, including cheese, milk powders, butter, fresh milk, and specialised dairy ingredients.

While northern Victoria is a key milk producing region, the processing footprint extends across the broader MDB and beyond, with key facilities located in NSW, South Australia, western Victoria, Gippsland and beyond. Many processors rely on cross-regional milk flows, meaning that reductions in sMDB production have supply chain effects to some degree across other regions.

These facilities support a diverse range of dairy production, with some processors focusing on high-value products such as cheese, specialty nutritionals, and fresh dairy, while others specialise in lower-value, commodity-based products such as milk powder and bulk butter.

However, processors sourcing milk from northern Victoria (and other regions) are facing increasing challenges due to the long-term contraction of the region's raw milk pool, which may lead to higher competition for supply, rising input costs, and potential adjustments in processing capacity.

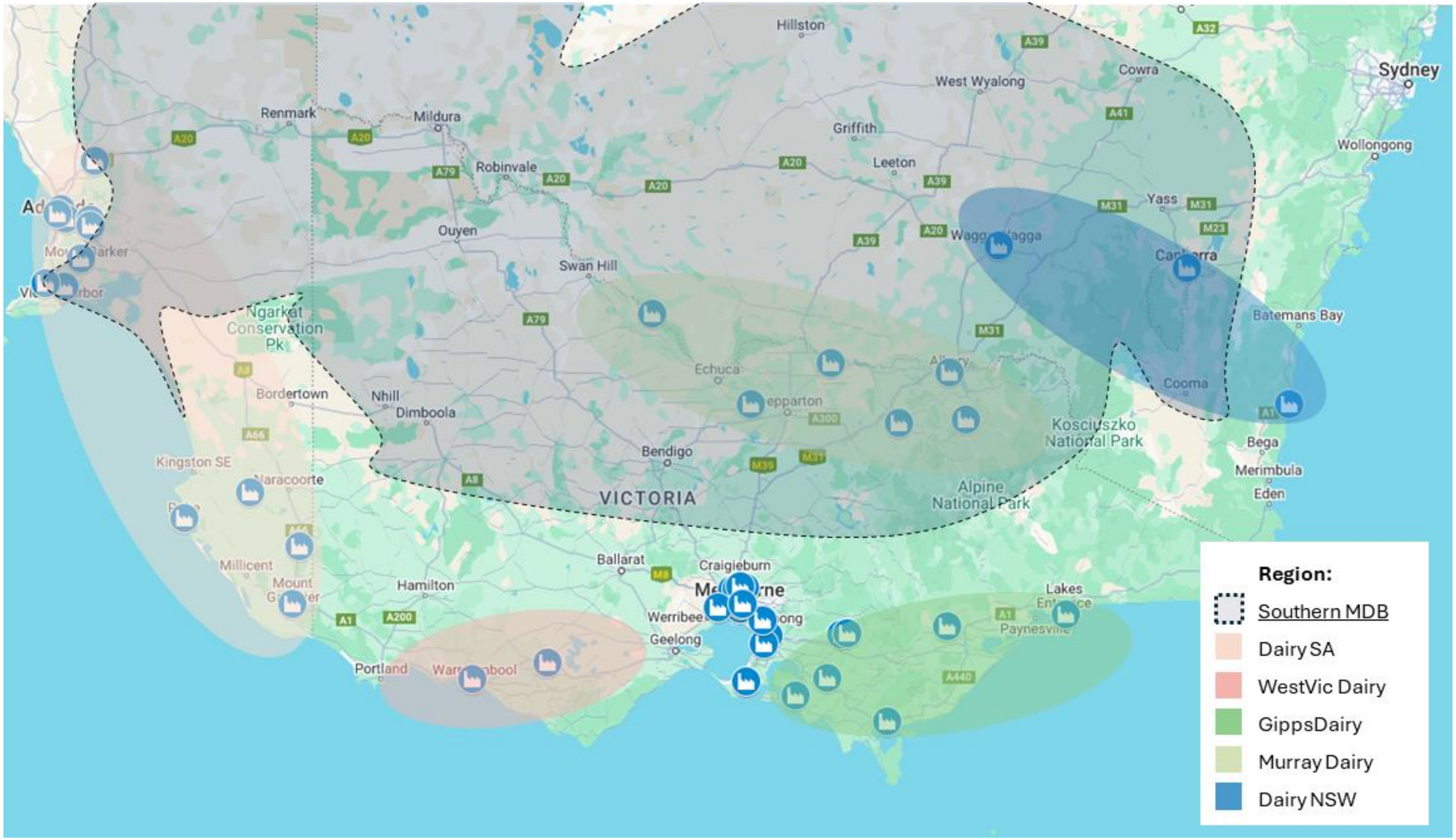
The structure of the companies within the processing sector varies significantly, with some companies operating a single facility while others manage multiple processing plants across different regions. Each processing company also has a different mix of product lines. Figure 3 and Figure 4 illustrate this distinction by mapping the locations of single-site processors and multi-site processors operating in the region.

The geographic distribution of processing plants reflects historical milk production patterns, but shifts in supply have altered sourcing models and increased transport distances. As milk production in the sMDB has, and continues to decline, some processors responded by adjusting their milk intake, modifying their production mix, or transporting milk in from alternative regions such as western Victoria, Gippsland and Tasmania. These shifts have been influenced by structural changes in the dairy sector, including declining farm numbers, increased competition for raw milk, water availability constraints, and changing market dynamics.

In addition, declining milk availability in the sMDB may have flow-on effects for supply chains that transport fresh milk to demand regions such as Queensland and northern NSW, where production deficits already require milk imports from Victoria and southern NSW. Processors serving these markets will need to manage increasing competition for available supply and rising transport costs.

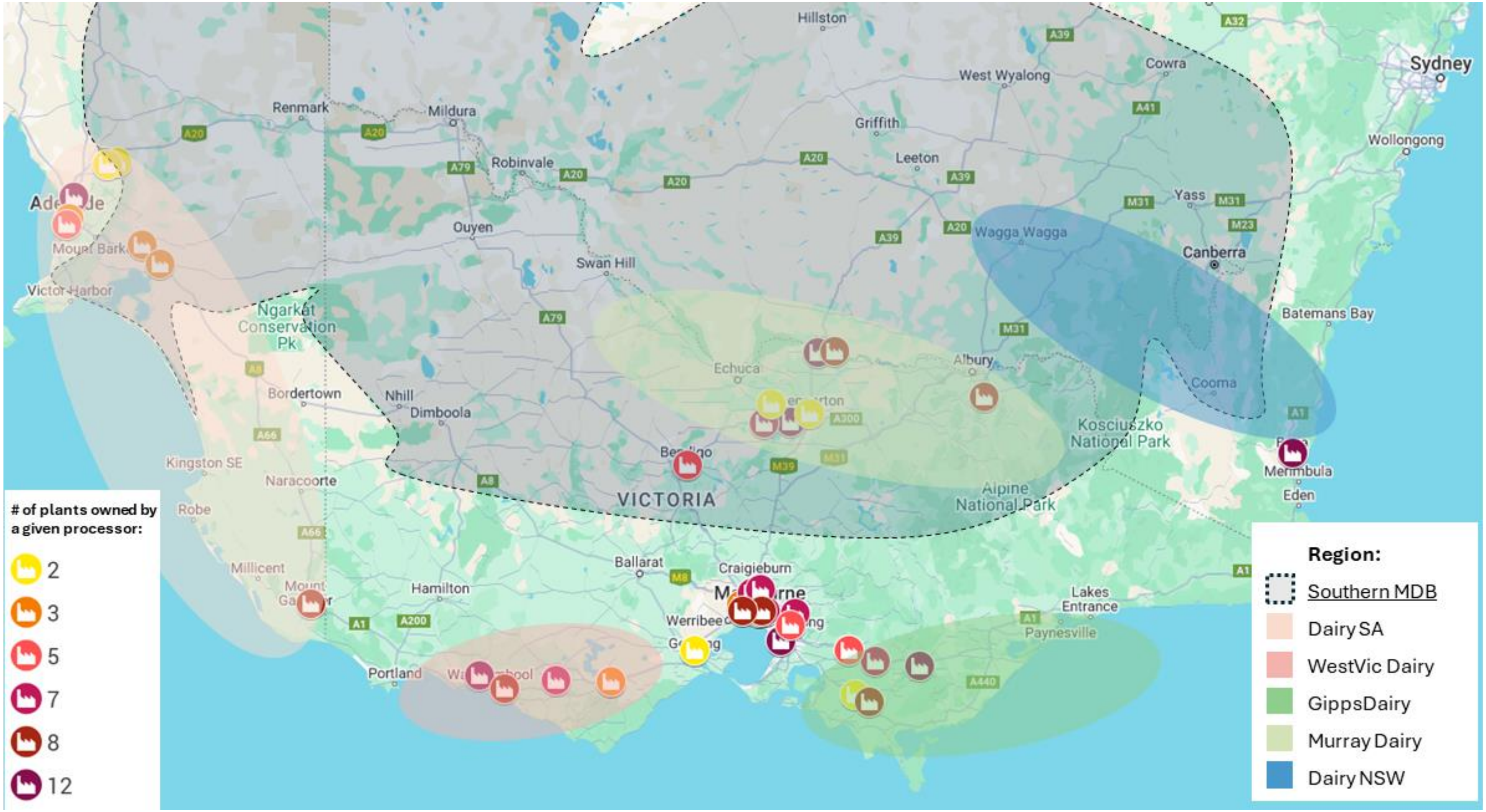
Processors need to navigate an increasingly competitive and uncertain supply environment. Rising transport costs, fluctuations in milk availability, and ongoing market pressures may drive further changes in processing operations, including adjustments to sourcing strategies, investment in efficiency improvements, or broader restructuring of production capacity.

Figure 3: Single-site dairy processors across broader sMDB [30]




30 Derived from Dairy Australia, 2025. [Australian dairy manufacturing overview, Company processing locations](#).

Figure 4: Multi-site dairy processors across broader sMDB [31]




31 Derived from Dairy Australia, 2025. Australian dairy manufacturing overview, Company processing locations.

## 9.2 INDUSTRY SIZE AND ECONOMIC CONTRIBUTION

The sMDB dairy industry plays a significant role in Australia's dairy sector, contributing substantially to milk production, employment, and regional economies. The sMDB produces approximately 1.85 billion litres of milk annually, accounting for around 22.8% of Australia's total milk production.[32] This milk supply supports a network of dairy farms, processors, transport operators, and associated service industries, making the sector a key economic driver for the communities within and around the sMDB.

There are approximately 36 processing facilities linked to milk production in the MDB. [33] The dairy industry directly employs over 7,000 workers, the farmgate value of dairy is approx. $1.494 billion,[34] and the total economic contribution of dairy to the community is estimated at more than $2 billion per annum. [35] Since late 2022, 17 dairy processing businesses have publicly announced a closure. [36] This is in addition to several other dairy processing factories suspending operations, closing production lines, rationalising operations and and/or announcing significant impairments on their dairy asset value.

Additional indirect economic benefits flowing to businesses that supply inputs such as feed, transport, and equipment to the dairy industry. The region's dairy output is integral to both domestic supply chains and export markets, with a proportion of milk being transported to processing plants outside the basin to meet demand in other regions, particularly Queensland, New South Wales, and South Australia.

Milk from the sMDB is used in the production of a wide range of dairy products, including cheese, milk powders, butter, liquid milk, and specialised dairy nutritionals. The sector is highly interconnected with broader national and international supply chains, with many processors balancing domestic retail and food service demand with export opportunities. The sMDB's role as a major milk-producing region is critical to the long-term sustainability of the dairy processing sector, and any continued contraction in production has the potential to disrupt supply chains, impact regional economies, and reshape Australia's dairy industry structure.

## 9.3 EXISTING PRESSURES ON DAIRY PROCESSORS

Dairy processors are facing multiple pressures stemming from long-term contracting raw milk supply, rising production and transport costs, market constraints, and increasing competition from both domestic and international sources. Together, these factors have created a challenging operating environment, requiring processors to adapt to shifting supply dynamics and evolving market conditions.

Processors are also exposed to global market conditions which are largely outside of their control. In favourable periods, strong export demand, stable milk supply, and a weak Australian dollar can boost processor margins, while at other times, low-cost imports and supermarket pricing pressure can erode profitability. For instance, recent trade restrictions imposed by China on New Zealand saw an influx of New Zealand dairy imports to Australia, while declining domestic milk production has driven up farmgate prices, squeezing processor margins. While processors can benefit from global price surges and favourable exchange rates, they remain price takers, highly exposed to shifting economic and policy conditions.

### 9.3.1 Historic decline in milk supply resulting in processing overcapacity

Milk production in the MDB has fallen by approximately 25% since 2012, driven by farms exiting the industry, shifting land uses, and water availability constraints. [37] This decline has contributed to an imbalance in the processing sector, as many existing processing plants were built to handle significantly larger milk volumes than are now available. In response, processing capacity is rationalising, with lower-value product lines and smaller processors exiting first. With excess processing capacity, some facilities are operating below efficient utilisation levels, driving up per-unit costs and putting pressure on margins. This overcapacity was partly driven by significant investment in processing infrastructure 5-10 years ago, based on expectations of sustained milk production levels that did not eventuate.

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32 Derived from Dairy Australia, 2023. Our Regions. Refer to Box 3 in section 5.4.1 for further information.
33 Processing facilities as at February 2025 are estimated by Dairy Australia in the Australian dairy manufacturing overview
34 Dairy Australia, 2024.
35 Dairy Australia, 2023. Dairy in the Basin, pg. 5.
36 ADPF, May 2025.
37 Dairy Australia, 2024.

#### 9.3.2 Rising costs across the supply chain

Dairy processors are facing rising costs across all aspects of their operations, including farmgate milk prices, energy, labour, transport, ingredients, insurances, and regulatory compliance. The cost of milk production has increased due to higher feed and water prices, and competition for limited milk supply is forcing some processors to pay premiums to secure contracts with farmers. Transport costs have also escalated due to longer collection routes, rising fuel prices, and increased freight costs, particularly for processors that rely on interstate milk transfers to meet demand. The cost of moving raw milk from northern Victoria to Queensland or New South Wales is also a material expense for processors supplying fresh milk markets.

#### 9.3.3 Market constraints and competitive pressures

The Australian dairy industry operates in a highly competitive market environment, with processors facing strong pricing pressures from major retailers and increasing competition from imported dairy products. Exports to global markets are highly competitive with countries such as New Zealand and Ireland. Supermarkets exercise significant control over retail pricing, limiting the ability of processors to pass on higher costs to consumers. At the same time, as previously noted, low-cost dairy imports are becoming more prominent in the Australian market, particularly in commodity segments such as cheese and milk powder. This intensifies competition and reduces the pricing power of local processors.

#### 9.3.4 Labour shortages and workforce challenges

Processors are also contending with labour shortages, particularly in regional areas where dairy processing plants are located. Many skilled workers have left the industry, and attracting new employees to regional processing sites is becoming increasingly difficult. An ageing workforce in both dairy farming and processing is exacerbating the problem, with fewer young workers entering the sector. The ability of processors to maintain a stable and skilled workforce is critical for long-term operational efficiency, yet labour availability remains an ongoing challenge.

#### 9.3.5 Uncertainty in milk supply and future industry restructuring

Given the structural challenges already facing the industry, processors are increasingly being forced to rethink their long-term business models. Some are already (or will increasingly be) shifting towards higher-value dairy products, examining how to realise further efficiencies in operations, or consolidating processing facilities. There is also an increasing need to explore alternative milk sourcing arrangements, including drawing more supply from other regions including Gippsland, western Victoria, and Tasmania to compensate for declining production in northern Victoria. The ongoing uncertainty surrounding milk supply has made longer-term planning more difficult, and it is likely that some processors will consider whether further plant closures or business restructures may be necessary in future.

# 10. EXPECTED IMPACTS OF BUYBACK ON DAIRY PROCESSORS

Water buybacks are expected to affect dairy processors, primarily through the impact on total milk supply, production costs, and industry structure. The extent of impact will depend on the total volume of water recovered from the dairy industry and the geographical distribution.

Higher water prices, increased farm financial pressures and farm industry exit will lead to lower milk production, shifts in regional supply patterns, and greater competition for raw milk among processors. This poses direct consequences for processor viability, with some plants facing under-utilisation, higher unit costs, and potential closure risks. Changes in milk availability may also impact transport and logistics networks, requiring processors to adapt sourcing strategies and potentially absorb rising freight costs.

This chapter explores the key factors resulting from the buybacks which are likely to affect dairy processors and have the potential to shape the sector’s future.

## 10.1 INCREASED COMPETITION FOR WATER AND COST PRESSURES

Water availability is a fundamental driver of raw milk production, and any reduction in access to irrigation water directly impacts milk supply and processor viability. Water buybacks will first affect dairy farmers, reducing their water access and increasing competition for available water, leading to higher water prices. As examined in Part A of this report, some farms may have to reduce herd sizes, cut production, or exit the industry altogether, further shrinking the milk pool available to processors.

When temporary water prices rise, especially in dry years, dairy farmers who own little entitlement and who rely on irrigation struggle to remain viable. The impact of buyback primarily affects dairy farmers, with flow on effects to processors through:

1. Reduced total raw milk supply: Fewer farms and smaller herds mean less milk available for processing, forcing processors to compete for a shrinking supply. Some may need to source milk from further afield than they have previously, such as from other dairy regions or interstate.
2. Reduced financial resilience of farmers: Higher water costs and increased financial strain make farmers more vulnerable to exit, and those who remain in production will seek the highest farmgate milk price possible. This may increase the risk of processors losing suppliers to competitors, forcing some to offer price incentives where possible to maintain supply. However, processors have limited ability to pass on these costs due to global milk pricing pressures, which constrain their pricing power.
3. Greater variability in milk production: Greater uncertainty regarding water availability, particularly in dry years, may result in fluctuating seasonal supply, creating challenges for processors managing throughput and supply chain efficiency.

Dairy already competes for water against higher margin, permanent horticultural crops such as almonds, citrus, and vineyards. While higher allocation prices remain a concern for the processing sector, processors generally do not bear these costs directly. Stakeholder interviews confirm that the majority of the water price impact is absorbed by farmers, rather than being passed directly to processors. However, processors experience indirect cost pressures due to competition for less milk and increased supplier volatility. The long-term risk is that milk supply shifts to more water-secure regions, increasing transport costs for processors reliant on milk from the sMDB.

As buybacks reduce farm viability, the structural changes in milk production will have wider implications for processors, forcing businesses to adapt to lower volumes, fluctuating supply, and rising sourcing costs.

The combined impact of buybacks, rising input costs, and climate risks is likely to accelerate structural change in the industry, favouring processors that have diversified sourcing strategies, strong balance sheets, profitable product lines, or operate in regions less dependent on irrigation. Smaller, regionally focused processors may face greater exposure to milk supply volatility, while larger players with more flexible processing operations may be better positioned to adapt. However, the industry as a whole remains exposed to shifts in water policy, making long-term strategic planning increasingly complex.

Processors will feel the effects of buybacks indirectly, as higher farm input costs and industry exit contribute to reduced production levels. While processors set the farmgate milk price, competition for milk may force some to offer price incentives at the margin to retain suppliers. However, their ability to do so is constrained by global pricing pressures, as higher domestic prices risk making Australian dairy less competitive and increasing import substitution. These pressures come on top of existing challenges. Even without the effects of buyback, market conditions have already forced some processors to consolidate or scale back operations.

## 10.2 MILK SUPPLY REDUCTIONS AND REGIONAL SHIFTS

Milk production impacts from buybacks may not be immediate but are expected to emerge over time as farms adjust to higher water prices and changing market conditions. Some farmers may initially absorb higher costs or rely on water carryover in wetter years. However, as water prices rise (and any carryover balances typically fall) during drier periods, some farms may reduce production, while others could exit the industry. This will shrink the total milk pool available to processors, increasing competition for supply and altering established sourcing patterns.

Processors across the MDB reliant on milk from northern Victoria and other irrigated dairy regions will be particularly affected. As production declines, milk sourcing will shift to alternative regions, such as Gippsland, southwest Victoria, western Victoria, and Tasmania. This shift has implications for processing efficiency, transport costs, and supply chain stability, as processors may need to transport milk over longer distances to maintain efficient throughput levels.

The ability of processors to adapt to these changes will vary, depending on their geographic footprint, flexibility in milk sourcing, and product mix. Those with diverse supply networks and higher-margin products may be better positioned to absorb rising costs, while others, such as those with fixed infrastructure in regions where milk supply is declining, may face increasing operational pressures.

As noted in section 9.2, the sMDB produces approximately 1.85 billion litres of milk annually, accounting for around 22.8% of Australia's total milk production.[38] The MDB region is home to approximately 36 processing facilities,[39] contributing 7,000 jobs and generating more than $2 billion in economic value.[40] Any contraction in production threatens not only processor viability but also broader supply chain networks and regional employment.

Approximately 200-250 million litres of milk are transported interstate each year, reflecting the region's importance to other markets. As sourcing shifts in response to declining milk supply, processors will face higher transport costs due to longer collection routes. This will add financial pressure, especially for processors with plants designed for a constant intake of fresh milk.

The key processing companies sourcing milk from the region include Fonterra, Bega, Lactalis, and Saputo, operating plants that produce a range of products, including fresh milk, cheese, powders and specialty nutritionals. With some processors more exposed to declining irrigation-based milk supply than others, regional production shifts will further shape industry competitiveness and future investment decisions.

This comes at a time when milk production in Queensland and northern NSW continues to decline, even as population growth increases demand for fresh milk in those regions. As a result, processors are becoming increasingly reliant on milk transported from the southern regions (including the sMDB) to service northern markets. Any further reductions in sMDB milk supply due to buybacks may place additional strain on this already stretched supply chain.

### 10.2.1 Potential foregone value of processed dairy products

A decline in sMDB milk production directly influences the volume of dairy products manufactured. Based on industry averages, the utilisation of raw milk across various dairy products is approximately as follows:[41]

- Cheese: 41%
- Drinking milk: 32%
- Skim milk powder/butter: 20%
- Whole milk powder: 2%
- Other products: 5%

Insights from processor interviews suggest that processors will prioritise maintaining production in higher-value segments, such as cheese and drinking milk, while absorbing a greater proportion of the reduction in lower-margin products, such as skim milk powder, butter, and whole milk powder. The estimates in Table 15 therefore assume processors will have a relatively greater focus on cheese and drinking milk in the face of reduced milk supply.

Specifically, based on these insights, the share of cheese was assumed to increase from 41% to 44% and drinking milk from 32% to 34%. Production of skim milk powder and butter were assumed to fall from 20% to 16%, and whole milk powder from 2% to 1%, given they are typically lower-value segments. 'Other products' were assumed to remain at 5%, as this category includes various specialised products that may have niche demand and contract-based supply commitments, making reductions less feasible.

However, these are general assumptions, and the actual reallocation of milk supply across product segments will depend on processor strategies, market conditions, and supply chain constraints. There is uncertainty in exactly how processors will respond to declining milk availability, and these results should be considered indicative.

The milk production reductions shown in Table 15 reflect those estimated through the farm-level impact assessment in Part A (refer to Table 13), and the projected decrease in product outputs has been adjusted to reflect these likely processor responses.

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38 Derived from Dairy Australia, 2023. Our Regions. Refer to Box 3 in section 5.4.1 for further information.

39 Processing facilities as at February 2025 are estimated by Dairy Australia in the Australian dairy manufacturing overview

40 Dairy Australia, 2023. Dairy in the Basin, pg. 5.

41 Dairy Australia, 2025. What percentage of milk is used as milk powder in Australia? (2017-18 data), and Dairy Australia, 2024. Australian Dairy Industry in Focus 2024.

Table 15: Indicative reduction in milk available for processed dairy products under Part A sMDB milk supply reduction scenarios

| Product | Low impact reduction (-60.23m litres/p.a.) | Central estimate (-179.85m litres/p.a.) | High impact reduction (-269.78m litres/p.a.) |
|---|---|---|---|
| Cheese | -60.23 | -179.85 | -269.78 |
| Drinking milk | -26.50 | -79.13 | -118.70 |
| Skim milk powder/butter | -20.48 | -61.15 | -91.73 |
| Whole milk powder | -9.64 | -28.78 | -43.16 |
| Other products | -0.60 | -1.80 | -2.70 |

Industry data indicates that the total value of processed dairy products in Australia is significantly higher than farmgate milk value due to value-adding. Estimates of the value generated per litre of processed milk vary based on product mix and market conditions. However, recent industry data indicates that the gross revenue per litre of processed milk ranges from $1.66 to $2.02, based on updated farmgate milk prices and historical processing value multipliers.

According to Dairy Australia's 2024 In Focus Report, the average national farmgate milk price in FY24 was 74.43 cents per litre, with prices varying by state from around 71 to 90 cents per litre.

Meanwhile, the ADPF and Deloitte Access Economics (2021)[42] previously estimated that the total value of processed dairy products is typically 3.3 times the farmgate price, meaning each litre of milk contributes significantly more value once processed into products like cheese, milk powder, and butter.

However, considering fluctuations in pricing and differences in product margins, a lower end estimate of the foregone revenue from processed dairy products of $1.50 per litre of raw milk may also be reasonable.[43] Note that these figures represent revenue rather than net profit, as they do not account for variable processing costs. [44] To account for inherent uncertainty in product mix, processing margins, and market prices, a scenario approach has been adopted. This allows for a plausible range of foregone revenue outcomes to be presented, rather than relying on a single point estimate.

By integrating these figures, the estimated revenue foregone from the milk production reduction scenarios calculated in Part A of this report can be estimated through three scenarios:

- Lower-end estimate: $1.50 per litre
- Central estimate: $1.66 per litre
- Higher-end estimate: $2.02 per litre

The potential foregone revenue of processed dairy products resulting from the milk reduction scenarios are presented in Table 16.

[42] Deloitte Access Economics and ADPF, 2021. Economic Contribution of the Australian Dairy Processing Industry

[43] Dairy Australia reports that in 2022–23, 90% of farmers achieved the industry's profitability target of $1.50 per kilogram of milk solids. Dairy Australia , 2024. Annual Report, 2023/24

[44] Lower total production volumes may also mean that processors have less throughput to contribute to fixed costs, which could lead to higher per-unit costs and further margin pressures, potentially reducing processor profitability by a greater proportion than the decline in revenue alone.

Table 16: Potential foregone revenue from processed dairy products under Part A milk reduction scenarios

| Milk reduction scenario | Milk reduction (million litres/p.a.) | Estimated reduction in processed dairy product revenue ($M/p.a.) | | |
|---|---|---|---|---|
| | | Lower-end estimate ($1.50/litre) | Central estimate ($1.66/litre) | Higher-end estimate ($2.02/litre) |
| Low impact | 60.23 | $90.35 | $99.98 | $121.66 |
| Central estimate | 179.85 | $269.78 | $298.55 | $363.30 |
| High impact | 269.78 | $404.67 | $447.83 | $544.96 |

Note: These figures are estimates based on industry averages and are intended to illustrate the scale of potential impacts.

These figures illustrate the financial risks faced by dairy processors under declining milk supply conditions. Processors that rely on high production volumes to maintain economies of scale may experience higher per-unit costs, reduced plant utilisation, and potential closures if supply constraints persist. The effects will likely be more pronounced in bulk dairy processing segments, such as milk powders and bulk butter, which have lower margins and compete with imported dairy products.

As previously outlined, other operating costs are also expected to increase, particularly for processors needing to source milk from further afield to maintain throughput. If processors are unable to offset these cost pressures through efficiency improvements, price adjustments, or product mix shifts, some regions could see an accelerated restructuring of processing capacity and job losses.

## 10.3 PROCESSOR VIABILITY AND POTENTIAL PLANT CLOSURES

The ongoing decline in sMDB milk supply places significant pressure on dairy processors, particularly smaller processors and those with lower-value production lines, which stakeholders indicated are most at risk of closure. Industry interviews highlighted that potential plant closures are not limited to regions where milk production is declining, with vulnerable sites also identified in Western Victoria, Gippsland, and Northern Victoria. Lower milk volumes could result in underutilised processing capacity and higher unit costs, making some plants financially unviable.

Plants that rely heavily on northern Victoria for milk intake, and especially those producing lower-margin commodity products such as milk powders and bulk butter, are likely to be the most vulnerable. Industry interviews indicate that some processors are already assessing the long-term viability of specific plants, with stakeholders identifying several sites at risk of closure.

In particular, facilities with older infrastructure, limited ability to pivot to higher-value products, or reliance on expensive long-haul milk transport are facing growing financial strain. Some processors may attempt to consolidate operations, shifting production to larger or more modern facilities, while others may reduce capacity or exit lower-margin product lines (such as milk powders, which are more sensitive to global prices).

Some processors may seek to consolidate production into fewer, more efficient sites, while others may explore alternative sourcing strategies or diversification into higher-margin dairy products to offset rising costs. However, without sufficient milk supply, maintaining all existing processing capacity may not be viable in the long term.

The ability to pass on rising costs is also limited, particularly where pricing is heavily influenced by major retailers. Processors with limited product diversification or inflexible infrastructure may face greater challenges in absorbing these costs. The extent of the impact will depend on factors including access to alternative milk supply regions, operational flexibility/adaptability, and the resilience of their product mix. Those with higher-margin products or the ability to adjust sourcing strategies may be better positioned to navigate industry changes, while others may need to explore operational efficiencies or strategic adjustments to remain competitive.

The impacts of plant closures would extend beyond the processor, affecting regional employment, economies and communities. Supply chain disruptions could cause remaining processors to adjust their sourcing strategies, further increasing transport costs and reshaping milk movement patterns across states.

### 10.4 TRANSPORT AND LOGISTICS IMPACTS

Reductions in milk production in the sMDB could have impacts for dairy transport operators as processors adjust to new sourcing strategies. Processors will need to collect milk from further afield, increasing transport distances and costs. However, lower milk volumes may also offset some transport cost pressures, depending on processor sourcing strategies.

Milk transport is already a major cost for processors, with approximately 200-250 million litres moved interstate annually to balance supply gaps. As sourcing regions shift, freight, fuel, and labour costs will rise. Longer transport distances may also complicate scheduling and logistics, particularly for fresh milk operations requiring frequent, time-sensitive deliveries.

Processors with established transport infrastructure (e.g. collection fleets, long term transport contracts, and/or strategically located processing plants) may be better positioned to manage these changes.

Over time, these transport challenges could contribute to broader structural adjustments in the industry, as processors weigh up the viability of continued milk collection from shrinking supply regions versus consolidating operations in areas with more stable production. The ability to efficiently manage milk movement will become increasingly critical as competition for available supply intensifies.

### 10.5 FINANCIAL AND MARKET IMPACTS

For processors, managing the financial impact of rising water prices and reduced milk supply will be challenging, as dairy products are highly commoditised and must remain competitive with global prices. Processors have limited ability to pass on higher costs, particularly in the fresh milk market and export sectors, where retail contracts and international competition constrain price flexibility. While some processors may need to pay higher farmgate milk prices to secure supply (as discussed in section 10.1), their ability to do so is limited, as significant price increases risk eroding the price competitiveness of Australian dairy, leading to greater import substitution.

The impact of these cost pressures will not be evenly distributed across the sector. Processors with higher-margin product portfolios may have greater flexibility to absorb rising input costs, whereas those producing lower-margin commodity products may struggle to maintain profitability. Import competition could also intensify market pressures, particularly if domestic production declines and overseas suppliers step in to fill supply gaps.

For some processors, supply chain adjustments and operational efficiencies may help offset cost pressures, but for others, ongoing financial strain could lead to plant rationalisation, shifts in product mix, or long-term structural changes in the industry. The extent of these impacts will depend on how processors respond to changing supply conditions, but overall, the industry is likely to experience a period of heightened uncertainty and adjustment.

## 11. ADAPTATION AND RESPONSE STRATEGIES

### 11.1 ADAPTING TO A CONTRACTING MILK POOL

As milk supply likely declines in future, processors will need to adjust operations, secure reliable supply, and manage rising costs. Their ability to adapt will depend on geographic location, supply chain flexibility, and product mix, with some processors better placed to respond than others.

One key adaptation will be securing stable milk supply. Processors may seek longer-term contracts with large farms to reduce exposure to fluctuating availability or shift sourcing to regions with more reliable production. However, expanding supply networks may increase transport costs, forcing processors to balance milk security with logistical efficiency.

Operational efficiency will also be critical for maintaining profitability. Some processors may consolidate operations, closing underutilised plants or streamlining production across fewer sites. Investments in processing technology, automation, and logistics optimisation could help reduce per-unit costs and improve efficiency in a constrained milk supply environment.

One key adaptation strategy identified by stakeholders is a shift to prioritising higher margin, value-added products relative to lower value commodity lines. Processors focused on cheese, specialty dairy, and nutritional powders may be able to offset rising milk costs more effectively than those producing bulk milk powder or butter, which are (relatively) more exposed to global price fluctuations. However, not all processors will have the capacity or market positioning to make this shift.

Ultimately, the ability to adapt quickly and strategically will determine which processors remain competitive in a constrained supply environment.

## 11.2 LONG-TERM STRUCTURAL CHANGES IN DAIRY PROCESSING

Ongoing shifts in milk supply and production costs will likely affect the structure of dairy processing, leading to fewer but larger processing plants, changes in how processors secure milk supply, and adjustments in market strategies to remain competitive

A key trend is likely to be industry consolidation, with fewer but larger, more efficient plants. As milk availability declines in some regions, processing is expected to become more concentrated in stable supply areas, while smaller, less efficient plants may face closure. This will likely accelerate the shift towards larger scale and more automated facilities.

Milk sourcing models may also evolve, with processors increasingly favouring direct contracts with large farms to ensure supply stability. Supermarkets and major buyers may further integrate their supply chains, potentially expanding direct sourcing arrangements or developing new supplier partnerships to maintain consistent milk flows.

Technological advancements will be central to longer term competitiveness. Investments in automation, flexible production systems, and energy efficiency will help processors manage rising costs and milk supply volatility. Some may also diversify beyond traditional dairy, exploring alternative milk types or product innovations to mitigate supply risks.

These shifts will favour processors that can scale, innovate, and adapt to changing supply patterns, while those unable to adjust may face financial strain, mergers, or market exit as competition intensifies.

# 12. CONCLUSION

The findings of Part B demonstrate that buybacks are likely to accelerate structural changes in the sMDB dairy processing sector. While the direct impact is on farm-level milk production, where farmers face higher water costs and, in some cases, reduced output, the flow on effects will be widespread. Processors will primarily be affected by the resulting decline in available raw milk supply, which may influence processor viability, supply chain dynamics, transport costs, and regional employment. Processors reliant on high volumes of milk for efficient operations will face increasing financial pressure, including challenges in servicing debt and covering fixed costs, with some plants at risk of closure or consolidation as milk availability declines.

The ability of processors to adapt will depend on their geographic footprint, supply chain flexibility, and product mix. Some will pivot towards higher-margin products, invest in automation, or restructure their operations to remain viable. However, not all processors will have the capacity to absorb rising costs, increasing the likelihood of industry consolidation and shifting milk flows to other regions. These adjustments will not only reshape the processing sector but also have significant consequences for regional communities dependent on dairy processing jobs and related industries.

The following sections summarise the key risks identified in this analysis and outline potential policy and industry responses to support the long-term sustainability of the dairy processing sector.

## 12.1 KEY FINDINGS

Our analysis highlights the potentially significant and compounding risks that buybacks pose to dairy processors as a result of declining raw milk production in the sMDB. While the direct impact on processors relates to reduced milk supply, the flow on effects extend throughout the sector and transport networks, with implications for regional employment and industry competitiveness. The key findings from this analysis include:

- Buyback will accelerate the decline in raw milk supply: Dairy production in northern Victoria has already declined significantly in recent decades and buybacks will likely exacerbate this trend. Processors have been adapting their businesses to adjust to fewer farms, less milk production, and rising input costs.

- Processor viability and industry consolidation: With sMDB milk production continuing to decline, some processors will struggle to maintain efficient operations. Many plants in the region were built for larger milk volumes than are now available, and underutilisation will drive up unit costs, making some sites financially unviable. Processors reliant on northern Victoria (particularly those with older infrastructure, lower operational flexibility, or a focus on low-margin products like powders and bulk butter) are at greater risk. Some will be forced to pay higher prices to secure supply, shift sourcing to other regions (e.g., Gippsland, western Victoria, or Tasmania), or consolidate operations into fewer, more efficient sites. These adjustments introduce cost pressures and may lead to plant closures, restructuring, or industry consolidation.
- Rising transport costs and distances: Processors are already transporting approximately 200-250 million litres of milk interstate annually. As sMDB milk production declines, processors will have to source more milk from further afield, increasing transport distances, costs, and potential supply chain inefficiencies. Interviews confirmed that transport costs have risen by up to 40%, driven by higher fuel prices, fleet costs, and longer collection routes. These increases may force some processors to reduce operations or pass costs onto farmers (where this is possible), further pressuring industry margins.
- Competition for milk supply will increase: With a smaller milk pool available, competition between processors for raw milk will increase, particularly among those that do not also own farms or have longer term supply contracts. Rather than increasing farmgate prices, processors may face tighter margins as lower milk volumes make it harder to cover fixed costs, including debt repayments. While operating profit margins may not change significantly, total profitability could decline due to lower throughput and higher unit costs. Smaller processors, particularly those producing commodity dairy products, are most at risk.
- Limited ability to pass on higher costs: The dairy industry operates in a highly competitive and price sensitive environment. Processors are price takers – they have little pricing power, making it difficult to absorb higher water, milk, transport, and energy costs. Without the ability to pass on costs, profitability will decline, potentially leading to further processor exits.
- Import substitution poses a growing threat: As Australian milk production declines and domestic costs rise, imported dairy products (e.g. mainly from New Zealand and the US) could increasingly replace locally processed dairy. This is particularly a risk for low margin products like cheese and milk powder, which already compete with global suppliers. If local processors struggle to remain cost competitive, Australia may become increasingly reliant on imported dairy to meet domestic demand.
- Future structural changes: Over time, processors will need to adapt to a shrinking raw milk pool, e.g. by investing in automation, efficiency improvements, and higher-value dairy products (e.g., specialty nutritionals, high-margin cheeses) to offset rising costs. Many are already exploring adaptation strategies, including shifting milk sourcing, prioritising higher-margin products, and improving operational efficiencies through plant rationalisation and logistics optimisation. However, not all processors will have the flexibility or capital to make these shifts, meaning further industry consolidation is likely. The most vulnerable processors are those with older plants, a reliance on low-value products, or a lack of diversified milk supply.
- Policy uncertainty: While buybacks are only one factor contributing to the pressures on dairy processing, uncertainty about future buyback volumes and policy direction makes longer term planning difficult. Processors require certainty on milk supply and water availability to make investment decisions, and ongoing policy changes create hesitation around capital investment and business restructuring.

## 12.2 LIMITATIONS AND AVENUES FOR FURTHER ANALYSIS

While this analysis provides a detailed assessment of the potential impacts of buybacks on dairy processors, several uncertainties remain. The precise volume and distribution of buybacks are not yet confirmed, making it difficult to fully quantify their long-term effects on milk supply and processing capacity. While the analysis assumes a range of potential reductions, actual outcomes will depend on government policy decisions, market responses, and other factors (e.g. environmental conditions).

There is also uncertainty regarding how farmers will respond to buybacks, including whether they will exit the industry or adjust production levels. These decisions will be influenced by water market conditions, alternative land use opportunities, commodity prices, and broader economic factors. While historical trends suggest that a decline in milk production is likely, the exact extent remains uncertain due to variables such as climate conditions, feed costs, and global dairy market movements.

This analysis also does not consider the likely future impacts of climate change upon milk production and processor viability. As water availability becomes increasingly variable and dry conditions more frequent, the supply-side risks to processors may be greater than those reflected in this modelling. Future climate pressures could further reduce milk supply, heighten sourcing and cost risks, and accelerate structural adjustment in the sector.

The ways in which processors adapt to declining milk supply will also vary, whether through plant closures, transport adjustments, or a shift towards higher-value products. Some processors may absorb costs for longer than expected, while others may exit the market faster than anticipated. The broader dairy market environment, including import competition, exchange rates, and retail pricing, will also influence the long-term sustainability of dairy processing in the sMDB.

Ongoing monitoring will be essential to assess actual supply reductions, processor viability, and regional economic impacts. Further analysis could also monitor milk production trends post buybacks, monitor processor performance and adaptation strategies, assess the impact of increased transport costs on supply chain efficiency, and evaluate the employment impacts from potential plant closures. Further research and engagement will also help to support decision making for processors and other key stakeholders.

# PART C: INPUT SUPPLIER IMPACTS AND LOCAL EXPENDITURE ANALYSIS

## 13. INTRODUCTION

This analysis seeks to assess the potential impacts of water buybacks on input suppliers and local expenditure within dairy-dependent communities. Dairy farms are significant contributors to regional economies, with their expenditure supporting a range of local businesses, including feed suppliers, fertiliser retailers, irrigation service companies, and machinery suppliers. Any reduction in dairy farm production and earnings due to buybacks has the potential to affect these upstream suppliers, leading to economic consequences beyond the farm gate.

This work seeks to leverage case studies to understand how changes in farm earnings and production may translate into reduced spending on key inputs and services. This will allow a high-level evaluation of the potential flow-on effects for local businesses and communities. It focuses on three key elements:

1. Baseline farm expenditure patterns
    a. Establishing current spending levels across key farm cost categories, including feed, fertiliser, labour, water, and equipment.
    b. Categorising expenditure into likely local (town-based), regional (state/major region-based), and non-local (national or international) spending to understand which input suppliers and service providers are likely to rely most heavily on dairy farm expenditure.
2. Scenarios to reflect potential reductions in farm expenditure as a result of buyback
    a. Leveraging the findings from Part A (i.e. estimating how buybacks may reduce milk production under Pathway C) and developing scenarios to project changes in farm expenditure.
3. Case studies of farm-level impacts on local economies
    a. Selecting four case study farms to examine how each farm's spending contributes to its local economy/community and how reduced expenditure may alter these patterns.
    b. Identifying potential economic consequences, such as reduced demand for labour, lower sales for local suppliers, and business viability concerns in dairy-reliant regions.

This provides a strategic, data-driven assessment of the potential regional economic implications of water buybacks and offers an initial view of how farm-level impacts may influence upstream supply chains and local communities. With further analysis, this may help to inform future policy considerations and adaptation strategies.

## 14. APPROACH AND METHODOLOGY

### 14.1 APPROACH

This assessment uses a case study approach to explore how water buybacks may impact local economies through changes in farm spending. The case study method was chosen as it provides a quantitative method to understand how potential changes in expenditure may affect local suppliers and services.

Findings from Part A of this report under Pathway C, in which farms reduce herd size and production, were applied given this would lead to a contraction in farm activity and corresponding cuts to variable input use.

### 14.2 METHODOLOGY

#### 14.2.1 Case study farm selection

A selection of four farms from the 11 case study farms examined in Part A of this report were selected to represent a mix of production systems, scale, and regional context, including differences in reliance on irrigation water. The selected farms were: Farm A, Farm B, Farm K and Farm D.

While this analysis focuses on four case study farms, it is important to note that the sMDB is home to an estimated 950 dairy farms (see Box 3 in section 5.4.1). This highlights the potential for widespread regional impacts, with the case studies providing insight into the types of changes that may occur across the broader industry.

#### 14.2.2 Baseline farm expenditure and classification

For each farm, baseline annual expenditure across key cost categories was established. These include feed, fertiliser, labour, water, machinery, and other operating costs. For each case study, impacts were modelled using the 2024 financial year, which is the most recent year data is available.

Each cost category was classified based on the likely primary location of the economic impact. These were formed based on assumptions regarding typical dairy industry practices in Northern Victoria and Southern NSW. Expenditure is allocated to one of three categories:

- Local (i.e. town-level): Spending that directly supports businesses and employment in the farm's local town or district. Likely to include labour, repairs and maintenance, fuel, local contractors, and some feed purchases.
- Regional (Major region or state-level): Spending within the broader dairy region or state. This may include fertiliser and chemical suppliers, large-scale feed providers, machinery dealerships, and irrigation service providers.
- Non-local (National or international): Inputs sourced from outside the region, including imported concentrates, equipment, and corporate service providers.

#### 14.2.3 Farm expenditure reduction scenarios

The analysis applied the average percentage reduction in milk production under Pathway C for each farm, as modelled across the years of their operations (refer to Table 9 in section 4.1.3 of Part A). These reductions in milk production were used as proxies under two scenarios for scaling down variable input spending. An upper-end reduction scenario reflected the average percentage reduction in milk production for each farm (e.g., a 19% reduction for Farm A), while a lower-end reduction scenario was calculated as half of this figure (e.g., 9.5% for Farm A). This approach reflects how lower milk production would proportionally reduce the need for inputs such as feed, fertiliser, labour, and other variable costs, while fixed costs were assumed to remain constant.

#### 14.2.4 Impact assessment

For each farm, the analysis calculated the dollar value of reduced spending across the classified cost categories. This allowed estimation of the potential revenue loss for local businesses, regional suppliers, and non-local providers. The assessment focused on identifying which suppliers and sectors are most exposed to reduced farm expenditure and therefore where local economic impacts are likely to be most pronounced.

#### 14.2.5 Qualitative assessment of broader impacts for the sMDB

Following the case study analysis, a qualitative assessment was undertaken to explore the potential scale of impacts across the sMDB dairy sector. This draws on case study insights and known regional dependencies to highlight areas of potential economic exposure. A broader quantitative assessment of economic impacts, such as employment and gross regional product is out of the scope of this analysis, however this report provides a discussion regarding the likely risks for local economies and suppliers.

# 15. BASELINE FARM EXPENDITURE

## 15.1 BASELINE FARM EXPENDITURE

This section establishes the baseline patterns of dairy farm expenditure, focusing on the key input categories from DFMP data which support regional economies. By understanding how farms typically allocate their spending, the likely impact of reduced production and earnings due to buybacks can be assessed.

Dairy farms rely on a broad mix of inputs to maintain production. For this analysis, the following categories of DFMP farm expenditure were considered based on their likely economic significance, relevance to production, and links to local and regional supply chains:

- Feed: Includes purchased concentrates, hay, silage, and other fodder. Feed represents a major operating cost and is directly tied to herd size and milk output.
- Fertiliser: Expenditure on pasture and cropping inputs, which support feed production and pasture quality. Fertiliser usage typically scales with herd size and production intensity.
- Labour: Paid employment costs. Labour is a key local expenditure item, with reductions in herd size likely to affect staffing needs.
- Machinery and equipment: Includes maintenance, repairs, and capital items. These costs support on-farm operations and are often delivered by local contractors and service providers.
- Other operating costs: Animal health, breeding, fuel, insurance, and other farm supplies. These variable costs scale with herd and farm activity levels and support a wide range of local and regional businesses.

## 15.2 DAIRY FARM INPUT SUPPLIERS AND THEIR REGIONAL ECONOMIC SIGNIFICANCE

Dairy farm expenditure supports many regional economies in the sMDB. Payments to employees, local service providers, and input suppliers circulate through communities, supporting jobs and businesses far beyond the farm gate. This spending sustains regional towns by driving demand for contractors, transport, retail, and services, contributing to local population retention and economic resilience. Reductions in farm spending, therefore, can have amplified effects across regional communities and their economies.

Input suppliers play a critical role in supporting the productivity and viability of irrigated dairy farms, who require access to reliable, cost-effective supplies of feed, fertiliser, fuel, machinery, and essential services such as veterinary care and animal health management.

Major input suppliers to dairy farms include:

- Feed suppliers: Providing hay, silage, fodder, and grain concentrates that underpin herd nutrition and milk production.
- Fertiliser and pasture service providers: Supporting pasture and crop growth through the supply of fertilisers, soil conditioners, and agronomic advice.
- Machinery and equipment dealers: Supplying and servicing tractors, irrigation equipment, and other infrastructure/assets critical to farm operations.
- Fuel suppliers: Enabling farm activities including irrigation pumping, fodder production, and milk collection.
- Veterinary and herd management services: Delivering animal health care, breeding programs, and herd testing that support productivity and animal health.

These suppliers contribute directly to local and regional economies:

- Many are based in small towns or regional centres within dairy-producing regions.
- They generate local employment including agronomists, mechanics, drivers, and skilled technicians (often in towns where employment opportunities in alternative industries are more limited).
- Their viability is closely linked to the scale and stability of local dairy production.

Dairy farming is often a major economic anchor within regional communities, with input suppliers forming part of an interconnected regional supply chain. Reduced farm production or changes in farm spending patterns (such as increased reliance on non-local suppliers) can have significant flow-on effects, challenging the financial sustainability of these local businesses and the towns they support.

The following sections explore how changes in dairy farm production and expenditure driven by water buybacks could impact these suppliers and the broader local economy.

# 16. ECONOMIC CONTRIBUTION OF DAIRY FARMS

This section presents four case studies illustrating how reductions in dairy production may affect farm spending and impact upon local suppliers and economies.

## 16.1 CASE STUDY 1 – FARM A

Farm A is a medium-sized irrigated dairy farm located in Northern Victoria. The farm operates an intensive production system with a herd size of approximately 1,000 cows and annual gross revenue typically between $2 million and $6 million. The farm holds a moderate level water entitlement, providing some security in the face of buybacks but leaving it exposed to changes in water allocation availability and prices.

Its production system relies heavily on purchased feed, irrigated pastures, and external services, making it a significant contributor to both local and regional supply chains.

Under Pathway C, farms respond to buybacks by reducing herd size and milk production, avoiding additional water and feed purchases. The modelled average milk production reduction for this farm was 19%, (which represents the upper-end impact scenario). A lower-bound scenario assumes the farm reduces production by half of this, or 9.5%.

### 16.1.1 Estimated reductions in farm expenditure

The production scale-back results in reduced spending across a wide range of variable input costs, with flow-on effects to local businesses and regional suppliers. Table 17 summarises the annual spending reductions under the higher (19%) and lower (9.5%) impact scenarios.

Table 17: Annual reductions in spending by cost category by scenario (case study 1)

| Farm cost category (DFMP) | Classification | High Impact ($) | Low Impact ($) |
|---|---|---|---|
| Concentrates purchase cost | Non-local | $428,030 | $214,015 |
| Fodder purchase cost | Regional | $48,180 | $24,090 |
| Hay & Silage cost | Regional | $133,511 | $66,755 |
| Fertiliser cost | Regional | $68,115 | $34,058 |
| Animal Health cost | Regional | $19,221 | $9,611 |
| Calf Rearing cost | Regional | $8,371 | $4,185 |
| Artificial insemination & Herd Test cost | Regional | $11,871 | $5,935 |
| Agistment Cost | Regional | $26,986 | $13,493 |
| Pasture & Cropping cost | Regional | $58,192 | $29,096 |
| Other Feed Purchase cost | Regional | $38,132 | $19,066 |
| Fuel & Oil cost | Local | $33,808 | $16,904 |
| Repairs & Maintenance cost | Local | $80,452 | $40,226 |
| Paid Labour cost | Local | $161,701 | $80,851 |
| Shed Power cost | Local | $17,294 | $8,647 |
| Dairy Supplies cost | Local | $24,551 | $12,276 |
| **Total** | | **$1,158,415** | **$579,208** |

#### 16.1.2 Local and regional economic impacts

The production reduction modelled for Farm A results in reduced expenditure across both local and regional supply chains. The scale of reduction varies by input type and supply chain location.

- Local impacts:
  - The most substantial local reduction is in labour spending, with a decrease of up to $161,701 in the high scenario. This represents a reduction in wages paid to farm employees.
  - Spending on repairs and maintenance, fuel, shed power, and dairy supplies also decreases. For example, repairs and maintenance expenditure reduces by $80,452 under the high scenario. These changes are likely to affect local businesses such as mechanical service providers, rural merchandise stores, and fuel suppliers, which commonly rely on farm sector demand.
- Regional impacts:
  - Expenditure reductions are also observed in inputs typically sourced regionally, including fodder, hay and silage, fertiliser, and animal health services. In the high scenario, annual spending on hay and silage decreases by $133,511, while fertiliser expenditure reduces by $68,115. These reductions may lower demand for regional suppliers and service providers involved in feed production, input supply, and livestock management services.
- Non-local impacts:
  - The largest dollar reduction occurs in concentrate purchases, with an estimated decrease of $428,030 in the high scenario. As these products are often sourced from national or international suppliers, the local and regional economic effects of this reduction are expected to be limited.
  - However, a portion of this expenditure may still support local or regional businesses through retail margins, transport services, or local handling and distribution, meaning that the economic impact is not entirely external to the local area.

#### 16.1.3 Summary of implications

The scale of the impact of reduced farm expenditure varies between the two scenarios but is consistently concentrated in cost categories with strong links to local and regional businesses.

Even under the lower bound scenario, reductions in spending on labour, maintenance, fuel, and other services are likely to be felt within the local economy, reducing income for local businesses and households. In the higher reduction scenario, these effects are amplified, with potentially more serious implications for employment and the financial performance of small businesses that service the dairy sector.

Regionally, demand for feed, fodder, fertiliser, and animal health services also declines, reflecting the farm's reduced herd size and therefore input use. The extent of this impact ranges from modest adjustments under the low scenario to more substantial reductions under the high scenario, particularly in feed-related supply chains.

While the largest absolute reduction is in concentrate purchases (ranging from $214,015 to $428,030) the economic effect of this change is expected to fall outside the region due to the non-local nature of these supply chains.

Overall, this case study illustrates that even partial production adjustments in response to water buybacks can result in lower spending in local and regional economies, with the scale of impact increasing proportionally as production reductions deepen.

## 16.2 CASE STUDY 2 – FARM B

Farm B is one of the larger dairy businesses in Northern Victoria. It has grown its gross revenue considerably over the data timeseries examined to be in excess of $19 million in the most recent reporting period, with a herd size of approximately 2400 cows.

The farm holds a high level of water entitlement, providing a greater buffer against water market volatility compared to smaller operations.

The farm operates an intensive system, heavily reliant on purchased feed, skilled labour, and regional service providers. Due to its scale, Farm B supports a wide range of local and regional businesses.

Under Pathway C analysis from Part A, this farm would reduce milk production by an average of only 2%, with the lower bound scenario therefore modelling a 1% reduction. These adjustments represent a relatively modest response, and reflect the farm's scale and water ownership position.

### 16.2.1 Estimated reductions in farm expenditure

Table 18 summarises the estimated annual reduction in spending across input categories for FY2024 under both the high (2%) and low (1%) scenarios.

Table 18: Annual reductions in spending by cost category by scenario (case study 2)

| Farm cost category (DFMP) | Classification | High Impact ($) | Low Impact ($) |
|---|---|---|---|
| Concentrates purchase cost | Non-local | $106,518 | $53,259 |
| Artificial insemination & Herd Test cost | Regional | $6,375 | $3,187 |
| Animal Health cost | Regional | $9,946 | $4,973 |
| Calf Rearing cost | Regional | $1,839 | $919 |
| Fertiliser cost | Regional | $10,320 | $5,160 |
| Other Irrigation Cost | Regional | $3,804 | $1,902 |
| Hay & Silage cost | Regional | $22,899 | $11,450 |
| Fodder purchase cost | Regional | $30,252 | $15,126 |
| Pasture & Cropping cost | Regional | $15,510 | $7,755 |
| Agistment Cost | Regional | $5,605 | $2,802 |
| Shed Power cost | Local | $5,099 | $2,550 |
| Dairy Supplies cost | Local | $2,655 | $1,328 |
| Fuel & Oil cost | Local | $5,470 | $2,735 |
| Repairs & Maintenance cost | Local | $22,837 | $11,419 |
| Paid Labour cost | Local | $61,162 | $30,581 |
| **Total** | | **$310,291** | **$155,146** |

### 16.2.2 Local and regional economic impacts

The reduction in production results in moderate changes in farm spending, with flow-on effects across local and regional economies.

Locally, the largest change is a reduction in paid labour of up to $61,162 under the high scenario. While relatively modest for a farm of this size, this reduction may still influence local employment levels and contractor engagement. Spending reductions in repairs and maintenance, fuel, shed power, and other local supplies further reduce demand for businesses servicing farm operations.

Regionally, the most significant impacts occur in feed, fertiliser, and irrigation services. In the high scenario, hay and silage purchases reduce by $22,899, and fodder purchases decline by $30,252. These changes represent lost revenue for regional suppliers that service large-scale dairy operations.

The largest dollar reduction is in concentrate purchases, falling by $106,518 in the high scenario. However, as these products are generally sourced from outside the region, the local economic impact is likely to be minimal.

### 16.2.3 Summary of implications

A 1-2% reduction in milk production from this farm would result in measurable, but relatively moderate, reductions in farm spending across local and regional economies.

Local impacts are concentrated in labour, fuel, and service-related expenditures, though the scale of change is less significant relative to the farm's overall operation. Regionally, reduced demand for feed and fertiliser could affect supplier businesses. The overall contraction in spending reflects the high degree of water entitlement ownership by this farm and therefore it's relative insulation from the allocation market.

Farms like Farm B have a greater capacity to absorb production changes while managing impacts on local economies. Nonetheless, even small percentage changes in production generate meaningful reductions in supplier revenue and service demand when considered at this scale.

## 16.3 CASE STUDY 3 – FARM K

Farm K is a medium-sized irrigated dairy farm located in Southern NSW, with a herd size of approximately 400 cows. The farm generates annual gross revenue between $2 million and $6 million and holds a moderate level of water entitlement, providing some resilience but still exposing the business to water market risks. The analysis models a 27% reduction in milk production under the high scenario (based on its average reduction in milk production under Pathway C), with a 13.5% reduction applied in the low scenario.

The farm operates an intensive production system, with significant reliance on purchased feed and external services. Like other medium-scale farms, Farm K contributes to local employment and supports a range of local and regional suppliers.

### 16.3.1 Estimated reductions in farm expenditure

Table 19 summarises the estimated annual reduction in spending for FY2024 under both expenditure reduction scenarios:

Table 19: Annual reductions in spending by cost category by scenario (case study 3)

| Farm cost category (DFMP) | Classification | High Impact ($) | Low Impact ($) |
|---|---|---|---|
| Concentrates purchase cost | Non-local | $228,036 | $114,018 |
| Artificial insemination & Herd Test cost | Regional | $11,899 | $5,950 |
| Animal Health cost | Regional | $14,927 | $7,463 |
| Calf Rearing cost | Regional | $3,985 | $1,993 |
| Fertiliser cost | Regional | $42,053 | $21,026 |
| Hay & Silage cost | Regional | $85,963 | $42,982 |
| Shed Power cost | Local | $8,924 | $4,462 |
| Dairy Supplies cost | Local | $8,031 | $4,016 |
| Fuel & Oil cost | Local | $17,042 | $8,521 |
| Repairs & Maintenance cost | Local | $28,206 | $14,103 |
| Paid Labour cost | Local | $65,904 | $32,952 |
| **Total** | | **$514,970** | **$257,486** |

### 16.3.2 Local and regional economic impacts

The production reduction modelled for Farm K results in material changes in farm spending, particularly in feed, labour, and various regional inputs.

Locally, the largest change is a reduction in paid labour of up to $65,904 under the high scenario, with lower spending on repairs, fuel, and shed operations further reducing demand for local service providers and rural suppliers. These changes could affect local employment and business turnover in nearby towns.

Regionally, the most significant impacts are reductions in spending on fertiliser, hay and silage, and animal health services. In the high scenario, hay and silage purchases fall by $85,963, reducing demand for regional fodder producers. Fertiliser use also declines by $42,053, which may affect rural supply businesses.

The largest single dollar reduction is in concentrate purchases, falling by $228,036 under the high scenario. However, some of this expenditure could support local or regional businesses through retail margins, transport services, or local handling and distribution, meaning that the economic impact is not entirely external to the local area.

#### 16.3.3 Summary of implications

Based on FY2024 data, Farm K's production reduction of 13.5% to 27% results in a material contraction in spending on both local services and regional inputs.

Local economic impacts are most evident in reduced labour demand, with potential job losses or reduced hours, and lower turnover for businesses providing mechanical services, fuel, and shed supplies. Regionally, input suppliers face reduced sales, particularly in fodder and fertiliser, which are closely tied to the scale of dairy production.

The largest change in expenditure is in concentrate purchases, which is expected to largely be a non-local impact. A portion of this expenditure could support local or regional businesses through retail margins, transport services, or local handling and distribution, meaning that the economic impact is not entirely external to the local area.

## 16.4 CASE STUDY 4 – FARM D

Farm D is a smaller irrigated dairy farm located in Northern Victoria, with a herd size of approximately 150 cows. The farm typically generates annual gross revenue below $2 million and holds low levels of water entitlement and therefore has a higher exposure to allocation markets. This analysis models a 43% reduction in milk production in the high scenario, based on its average level of reduced milk production under Pathway C, and a 21.5% reduction for the low scenario.

As a small business, Farm D is heavily reliant on purchased feed and local services, with farm spending contributing directly to the local economy.

#### 16.4.1 Estimated reductions in farm expenditure

Table 20 summarises the estimated annual reduction in spending for FY2024 under both scenarios:

Table 20: Annual reductions in spending by cost category by scenario (case study 4)

| Farm cost category (DFMP) | Classification | High Impact ($) | Low Impact ($) |
|---|---|---|---|
| Concentrates Purchase cost | Non-local | $67,570 | $33,785 |
| Artificial insemination & Herd Test cost | Regional | $9,071 | $4,536 |
| Animal Health cost | Regional | $6,418 | $3,209 |
| Calf Rearing cost | Regional | $1,089 | $544 |
| Hay & Silage cost | Regional | $4,616 | $2,308 |
| Fodder Purchase cost | Regional | $9,417 | $4,709 |
| Fertiliser cost | Regional | $2,374 | $1,187 |
| Shed Power cost | Local | $8,191 | $4,096 |
| Dairy Supplies cost | Local | $7,273 | $3,637 |

| Farm cost category (DFMP) | Classification | High Impact ($) | Low Impact ($) |
|---|---|---|---|
| Fuel & Oil cost | Local | $7,036 | $3,518 |
| Repairs & Maintenance cost | Local | $13,032 | $6,516 |
| Paid Labour cost | Local | $15,140 | $7,570 |
| **Total** | | **$151,227** | **$75,615** |

### 16.4.2 Local and regional economic impacts

The farm's reduction in milk production is significant in terms of its typical levels of output. This results in significant changes to farm spending, which, although lower in dollar-value terms in comparison with other farms, still poses material flow-on effects to the local and regional economy.

Locally, reduced spending on labour, maintenance, and shed operations presents the most immediate impact. Labour expenditure falls by up to $15,140 under the high scenario, potentially affecting employment or contract hours within the local community. Repairs, fuel, and dairy supplies also reduce, affecting service providers and suppliers in the district.

Regionally, reduced spending on fodder, hay, fertiliser, and animal health services reflects the scaled-back herd size and lower production levels. For example, fodder purchases drop by $9,417 in the high scenario, reducing income for regional feed suppliers.

The largest dollar reduction is in concentrate purchases, down $67,570, which is expected to largely be a non-local impact. However, as with other case study farms, some of this expenditure could support local or regional businesses through retail margins, transport services, or local handling and distribution, meaning that the economic impact is not entirely external to the local area.

### 16.4.3 Summary of implications

Farm D's more significant production reduction of 21.5% to 43% results primarily in impacts to local employment and services, as well as regional input suppliers.

Local impacts include reduced wages and service demand, which may affect small businesses that depend on the dairy sector. Regionally, the reductions are most visible in feed and fodder demand, potentially affecting supply businesses tied to dairy.

Farm D demonstrates that the production adjustments of smaller farms in response to water buybacks can still significantly affect local economic activity in dairy-reliant areas.

# 17. LOCAL ECONOMIC IMPACTS AND SUPPLIER VULNERABILITIES

The case studies demonstrate how reductions in milk production and expenditure flow through to local businesses, regional supply chains, and service providers. This section draws together the findings to assess the broader implications for local economies, supplier sectors, and community resilience within the sMDB.

## 17.1 SUMMARY OF CASE STUDY FINDINGS

Across the four farms, reductions in milk production led to significant contractions in spending, with impacts concentrated in:

- Labour: Paid employment reductions ranged from $15,000 to $161,000 per farm in high-impact scenarios. For smaller farms, this represented a substantial proportion of local employment spending.
- Feed and fodder: Spending reductions on fodder, hay, and silage ranged from $4,600 to $133,500 per farm, particularly affecting medium and large operations.
- Fertiliser and pasture inputs: Spending fell by up to $68,000 per farm, impacting regional suppliers.

- Repairs, maintenance, and local services: Spending reductions between $13,000 and $80,000 per farm affected local businesses such as mechanics, fuel suppliers, and rural contractors.
- The largest absolute reductions were typically in concentrate purchases, which are typically sourced from national or international markets. However, some of the reduction in expenditure on concentrates is likely to support local or regional businesses through retail margins, transport services and local handling and distribution. This suggests that a portion of the reduction in expenditure would impact upon local and regional businesses in the supply chain.

## 17.2 IMPLICATIONS FOR LOCAL BUSINESSES AND EMPLOYMENT

Local economic impacts are likely to be most pronounced in:

- Labour markets: Reduced spending on farm labour and contractors risks local job losses or reduced working hours, particularly in smaller dairy-dependent towns.
- Local service providers: Decreased demand for rural contractors, machinery dealers, fuel suppliers, and mechanical services erodes turnover and may undermine business viability.
- Township economies: As dairy farms reduce expenditure, lower income flows into local businesses may impact the broader town economy, with potential effects on population retention and local services.

## 17.3 SECTOR-SPECIFIC SUPPLIER VULNERABILITIES

Certain input suppliers and service sectors are particularly exposed to reduced dairy production:

- Regional feed suppliers (hay, silage, fodder) face the most immediate risk from declining demand, particularly in dry years when dairy purchases typically peak.
- Fertiliser and pasture service providers are sensitive to lower input use as herd sizes shrink.
- Animal health and breeding services may experience reduced demand as farm systems contract.
- Machinery dealers and contractors could see declining sales and servicing volumes, especially in towns highly reliant on the dairy industry.

## 17.4 CASCADING RISKS AND MARKET SHIFTS

Extended reductions in farm production and expenditure could trigger broader supplier risks:

- Revenue losses and credit risks: Suppliers may face reduced orders, delayed payments, and tightening cash flows.
- Market share erosion: Farms may shift purchasing to larger regional or national suppliers offering lower prices or bulk deals, further weakening smaller local businesses.
- Business closures or consolidation: Prolonged contraction could force some businesses to exit the market or downscale operations.

The dairy transport and logistics sector also emerges as a potential pressure point. Reduced milk volumes impact the viability of collection routes and fleet operations. Transport operators report increasing inefficiencies due to longer routes and fewer collection points. Continued contraction may force service reductions, particularly in more isolated regions.

## 17.5 SUPPLIER ADAPTATION AND MARKET SHIFTS

While some input suppliers face contraction risks, others may adapt by diversifying their offerings or pursuing new markets. Feed suppliers, for example, could target cropping enterprises or expand services into higher-production regions. Machinery dealers might shift focus to broader agricultural sectors. However, the capacity to adapt is uneven. Smaller, specialised, or highly dairy-dependent businesses will likely face the greatest challenges in maintaining viability.

## 17.6 COMPARATIVE INSIGHTS ACROSS FARM SCALES

The case studies reveal distinct patterns based on farm size and system:

- Smaller farms, like Farm D, experienced the greatest proportional reductions in local spending, with significant impacts on labour and local service providers. These changes pose acute risks for small towns reliant on a limited number of dairy operations.
- Larger farms, such as Farm B, absorbed production changes more readily due to their scale and water security. However, they drove larger absolute reductions in feed and input demand, creating significant revenue risks for regional suppliers despite smaller proportional local effects.

These differences highlight that community exposure to the impacts of reduced farm expenditure will vary. Smaller towns will likely face more severe, localised impacts, while regional supply chains could potentially suffer substantial revenue losses from large farm adjustments.

# 18. IMPLICATIONS FOR SMDB DAIRY REGIONS

While the case study findings demonstrate how individual farms may reduce spending in the short term in response to buybacks, the broader economic impacts across the sMDB will depend on how widespread and sustained production reductions become. Adverse impacts could be significantly exacerbated in the face of extended, permanent reductions in production at the farm-level and cumulative industry exit. Full quantification of these impacts is outside the scope of this analysis. However, several important qualitative insights emerge, as discussed in this section.

## 18.1 POTENTIAL SCALE OF IMPACT ACROSS THE REGION

Dairy production in the sMDB underpins significant economic activity within local communities, particularly in irrigated regions of northern Victoria and southern NSW. If water buybacks lead to widespread reductions in farm production, the cumulative effect on local businesses, employment, and regional supply chains could be substantial.

The case studies demonstrate that:

- Even modest production reductions generate meaningful cuts to local spending on labour, repairs, and services.
- Regional suppliers (particularly in feed, fertiliser, and pasture inputs) are highly exposed to reductions in dairy demand.
- Small towns with heavy reliance on irrigated dairy farms face heightened risk of economic contraction.

The extent of impact will depend on:

- The proportion of farms reducing production versus adapting through other means.
- The concentration of dairy production within specific towns or regions.
- The capacity of affected communities and businesses to diversify or absorb the economic shock.

Dairy-reliant communities with limited economic diversification are most vulnerable to flow-on effects from reduced farm spending. These include towns where:

- Dairy farms are major employers and service users.
- Local businesses (e.g. contractors, fuel suppliers, mechanics) rely heavily on the dairy sector.
- Feed, fodder, and pasture suppliers depend on consistent (and reasonably predictable) dairy demand.

In such areas, reductions in farm expenditure could trigger wider economic impacts, including:

- Job losses or reduced work hours in local businesses.
- Lower demand for local services, contributing to population decline.
- Reduced investment in infrastructure and community assets.

It is likely that, in the longer-term, communities most reliant on the economic contribution of the dairy industry will experience broader societal impacts to services and potentially community cohesion as cumulative reductions in economic activity and job losses flow through to other parts of the economy. The impact of reduced expenditure in the dairy supply chain will likely flow through to related or dependant industries and community services as adverse impacts such as job losses reduce aggregate demand in local economies.

Workers unable to secure suitable alternative employment in their local communities may choose to relocate. This can impact upon community cohesion and negate sustainable community growth and development as individuals and families move away. This phenomenon has been observed in the face of industry decline in many regions and leads to or exacerbates social and economic disadvantages.

By contrast, larger regional centres with more diversified economies may absorb impacts more effectively, though supply chain businesses focused on dairy will still face revenue pressures.

It is also important to note that this analysis does not explicitly consider the future impacts of climate change. More frequent droughts and increasingly unpredictable water availability could further reduce dairy farm output over time, amplifying the scale and intensity of local economic effects across dairy-reliant communities.

## 18.2 SUPPLY CHAIN ADJUSTMENTS AND UNEVEN IMPACTS

As farms adapt to changing production levels, supply chains may also shift. Some suppliers may:

- Consolidate or downscale operations.
- Shift focus to servicing remaining larger dairy operations or other agricultural sectors.
- Pursue new markets outside the region.

However, smaller, specialised, or highly dairy-dependent businesses will have fewer options and may face closure. This creates risks of uneven economic impacts, with losses concentrated in more exposed towns and industries.

# APPENDICES

# APPENDIX 1 DFMP DATA CATEGORIES USED IN MODELLING

The Dairy Farm Monitor Project (DFMP) offers a rich dataset providing detailed timeseries data for individual farms, spanning a variety of farm financial, operational, and production data categories. Table 21 presents the data categories referenced in the farm-level modelling described in Part A of this report.

Table 21: DFMP data categories used in modelling

| Data | Unit |
|---|---|
| **Farm physical and production data** | |
| Litres | litres |
| Fat | kg |
| Protein | kg |
| Milk Solids | kg |
| Cows | # |
| Production per Cow | mS/cow |
| Total Farm Area | ha |
| Total Useable Area | ha |
| Milking Area | ha |
| Irrigable Area | ha |
| Water Use - Total | megalitres |
| Water Use - Allocation | ML |
| Water Use - Inventory | ML |
| Inventory Water Price | ML |
| Water Use - Purchases | ML |
| TWE Price | $/ML |
| Total Feed (t DM) | t DM |
| Home Grown Feed (t DM) - Grazed | t DM |
| Home Grown Feed (t DM) - Conserved | t DM |
| Home Grown Feed (t DM) | t DM |
| WUE (water use efficiency) | ML / t DM |
| Purchased Feed (t DM) - Total | t DM |
| Purchased Feed (t DM) - Concentrate | t DM |
| Purchased Feed (t DM) - Fodder | t DM |
| Concentrate Price ($/t DM) | $ / t DM |
| Fodder Price ($/t DM) | $ / t DM |
| **Farm income** | |
| Milk Income | $ |
| Livestock Trading Profit | $ |
| Other Income | $ |

| Data | Unit |
|---|---|
| Non-farm income | $ |
| Interest Subsidy | $ |
| Government Grants | $ |
| Other Revenue | $ |
| **Farm costs** | |
| *Herd costs* | |
| AI | $ |
| Veterinary Expenses | $ |
| Calf Rearing | $ |
| *Shed costs* | |
| Dairy Expenses | $ |
| Electricity | $ |
| *Feed costs* | |
| Agistment | $ |
| Fertiliser & Spreading | $ |
| Concentrate Purchases | $ |
| Fodder Purchases | $ |
| Fodder Conservation Costs | $ |
| Fuel & Oil | $ |
| Irrigation Costs | $ |
| Water Purchase | $ |
| Pasture Renovation | $ |
| Other Feed Costs | $ |
| Feed Inventory Change | $ |
| Water Inventory Change | $ |
| *Overhead costs* | |
| Insurance | $ |
| Paid Labour | $ |
| Imputed Labour | $ |
| Motor Vehicle Expenses | $ |
| Other Overheads | $ |
| Rates & Taxes | $ |
| Repairs & Maintenance | $ |
| Depreciation | $ |
| *Capital costs* | |
| Machinery & Improvements | $ |

| Data | Unit |
|---|---|
| Livestock Purchases | $ |
| *Finance costs* | |
| Interest | $ |
| Hire Purchase & Lease Payments | $ |
| **Assets** | |
| Livestock | $ |

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