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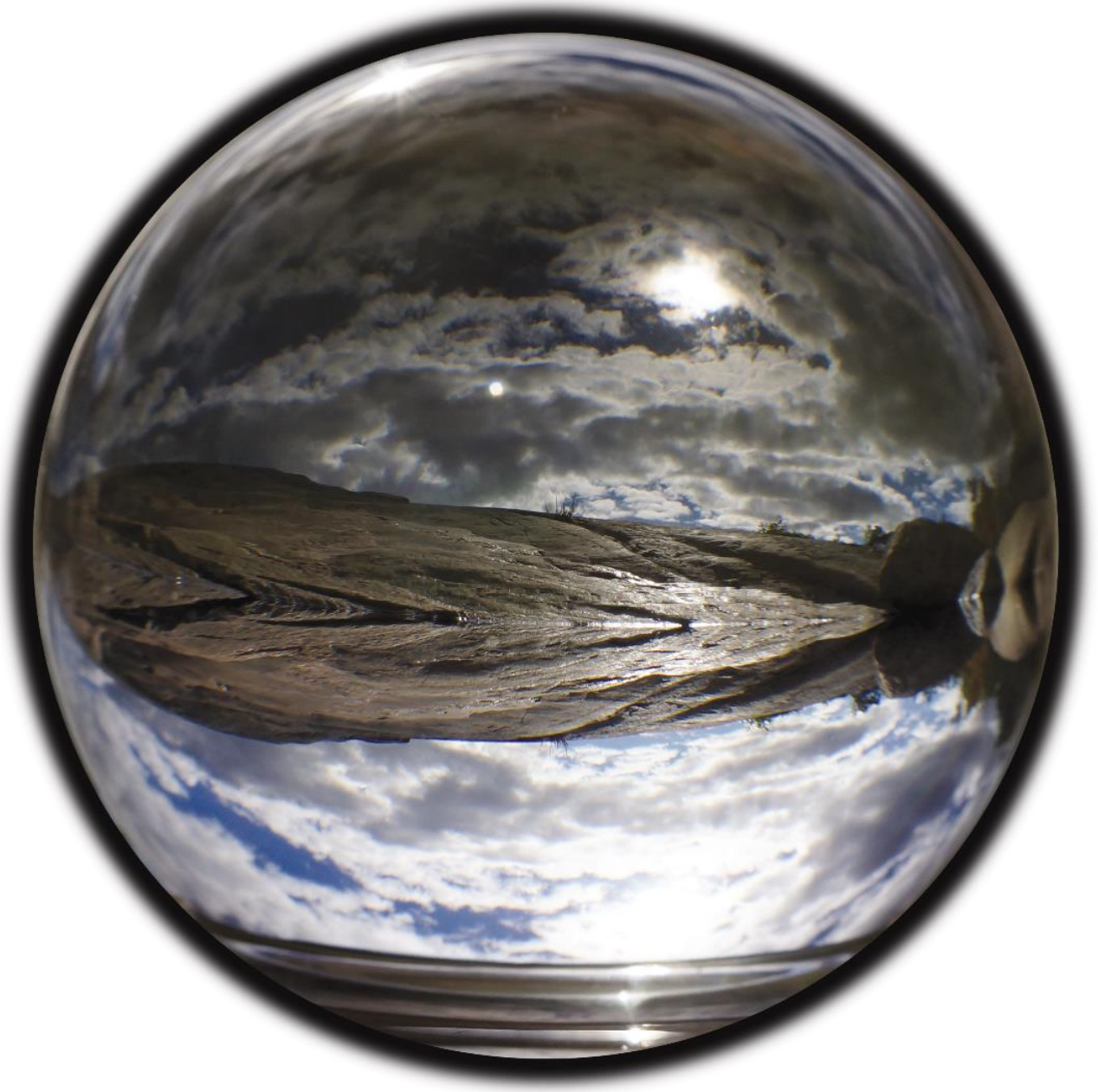


NSW farming sector gross margin analysis

WaterNSW 2024 price submission - supporting analysis

20 September 2024

Deloitte Access Economics

Contents

Glossary

Acronym / Term	Definition
AAGIS	Australian Agricultural and Grazing Industries Survey
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
Costs of goods sold	Costs that vary proportionately based on production levels each year. For example, fertiliser, raw materials costs (livestock and seeds) and water
Fixed costs	Costs of which the nature does not vary based on production levels each year. For example, interest costs, rents and Shire rates.
Gross margin	Revenue minus cost of goods sold. Throughout this report gross margins are often reported as a percentage of revenue to allow for comparison across markets
IPART	Independent Pricing and Regulatory Tribunal
NSW	New South Wales
Profit	Revenue minus total costs (fixed costs plus cost of goods sold).
Profit margin	Profit as a percentage of total revenue
Revenue	Farm income from business operations

Executive summary

The Independent Pricing and Regulatory Tribunal (IPART) is responsible for setting the rural bulk water prices that WaterNSW can charge its customers in New South Wales (NSW). As part of its 2021 price review the IPART conducted a high-level assessment of the capacity of bulk water customers in NSW to deal with higher water prices. This report provides a contemporary and detailed look at the financial position of bulk water customers and their potential exposure to higher water prices. It aims to provide a robust evidence base to inform WaterNSW's Price Submission for 2024 based on the best available public data.

As is common in the agriculture sector, New South Wales (NSW) farmers have seen volatile profit levels over time. High commodity prices and strong yields in recent years have boosted profit performance in the sector, following weaker than normal financial returns which were seen around the time of the previous IPART review. Historically however, profit performance has varied across market segments.

Based on averages across regions and sub-sectors over recent years, farms that are most exposed to higher water costs in NSW have had the greatest capacity to pay. Water charges are most important for the largest consumers of water in the State – intensive irrigating sectors like broadacre cropping (especially rice and cotton), and in irrigation dependant regions such as the Riverina. While these customers are most exposed to higher bulk water prices, they have in general enjoyed strong profit margins in recent years which provide some financial buffer to absorb higher water charges.

While the dairy and livestock sectors are less exposed to water charges, they are more financially vulnerable and may see their viability squeezed further by increases in bulk water prices. Profit margins in the dairy and livestock sectors are already below the economy average putting pressure on the long-term viability of these farms. Volumetric water use is low in these sectors, meaning that a large share of the average water bill for these customers is for fixed access charges. As a result, these customers will still be negatively impacted by increases in WaterNSW access fees.

"On average the NSW agriculture sector is currently in a good position to absorb bulk water price increases. Water charges have been a small proportion of costs for most farms in recent years. However, some groups are more vulnerable, including dairy and other irrigating livestock farmers, and may see their viability squeezed by higher bulk water prices."

Scenario analysis indicates that on average the impacts of raising bulk water prices would be small, although certain groups would see greater impacts. Water price increases of inflation plus 15% are expected to reduce the average profit margin across the sector by 0.2 percentage points, or 2.9%. This assumes that bulk water price increases impact all farm water charges (in reality not all water charges will be equally impacted), and applies to both access and usage charges.

On average, broadacre cropping followed by the Riverina region are expected to see the largest impacts on profit margins under a 15% increase in bulk water prices. Despite this, the average farms in these market segments would remain in a healthy financial position after the shock with overall profit margins well above the Australian economy average. In contrast, the dairy industry has weak profit margins relative to the economy average which would deteriorate further with bulk water price increases, putting these customers in a more vulnerable position.

The structure of any price increase in terms of access and usage fees will influence which groups bear the greatest costs. Increases in volumetric per ML water use charges would particularly impact large water users like the broadacre cropping sector where profit margins have been the highest. Whereas

increases in fixed access charges would disproportionally impact dairy customers, where there are many irrigators who use relatively little water.

Outside of water charges, rising interest costs present a challenge for the sector, although low industry exit rates suggest that on average firm viability levels remain healthy. Agricultural interest costs are notable and generally vary in line with movements in interest rates. This cost line is estimated to have more than doubled as a share of total costs for the average farmer since 2021/22. Exit rates in the industry have been low though and, while certain customers are more vulnerable, on average levels of farm viability appear to have been healthy.

On average, agricultural bulk water customers appear well placed to deal with higher water prices, helped by a series of strong years recently. That said, even within the market segments examined here the experiences of individual farms can vary widely. Some farmers will be more exposed to water costs than the average, and some will be under greater financial pressure. Furthermore, a series of poor years – defined by either or both of poor seasonal conditions and/or low agricultural commodity prices – would lower the ability of the sector to absorb higher charges.

It is also important to note that while this report utilises the best available public data on the NSW agriculture sector, good quality data is limited. This has restricted the granularity of the analysis in places and led to some necessary assumptions, particularly around irrigators and the share of agricultural water charges that are impacted by WaterNSW bulk water prices. These limitations would be difficult to overcome without further, targeted data collection from within the sector.

1 Background

1.1 Purpose

The Independent Pricing and Regulatory Tribunal (IPART) is responsible for setting the rural bulk water prices that WaterNSW can charge its customers in New South Wales (NSW). While the primary focus of IPART's decision-making when setting bulk water prices is around the efficient costs of delivering water, the effect of price changes on customers and other stakeholders has been considered in the past and is crucial to understanding the impact of potential pricing outcomes.

As part of its 2021 price review the IPART conducted a high-level assessment of the capacity of bulk water customers in NSW to deal with higher water prices.[1] However, this review did not reflect the substantial variation in the importance of water charges across regions and sectors. A more detailed analysis can represent the financial position of irrigators and other agribusiness water customers more accurately in NSW and consider relevant recent trends.

This report provides a contemporary and detailed look at the financial position of bulk water customers and their potential exposure to higher water prices. It aims to provide a robust evidence base to inform WaterNSW's Price Submission for 2024 based on the best available public data, which is limited.

1.2 WaterNSW and its customers

WaterNSW is the NSW government agency responsible for the state's dams, capturing and storing water, and then supplying it ready for distribution – for the environment, agriculture, industry and the community.

With 41 major dams and hundreds of waterways across the state, WaterNSW plays a vital role at the source of the state's water, delivering two thirds of all water used in NSW. While some of the water WaterNSW supplies is treated and provided as drinking water or used in other processes such as mining operations, by far the largest user of bulk water is the agricultural sector in general and irrigation in particular.

Rural bulk water prices are set by IPART, with full reviews undertaken every five years and smaller annual reviews undertaken in the interim period. In September 2021 IPART published a Final Report for the most recent review of WaterNSW's rural bulk water prices. These prices were set based on cost recovery principles and reflect a range of factors relevant to the efficient expenditures of WaterNSW in delivering bulk water to rural customers in each valley across NSW. Prices have a fixed and a volumetric component.

Not all bulk water costs are passed on to customers, with the NSW government bearing a portion of the costs determined by IPART's cost shares framework. In addition, prices have been set below full cost recovery in the North Coast and South Coast valleys. Current bulk water prices are set so that customers pay around 71% of the net revenue requirement of WaterNSW.[1]

Increases in the efficient cost of providing bulk water create upward pressure on prices, but any price determination must take account of the financial viability of WaterNSW's customers to ensure that any increases are affordable across major market segments. As most farmers have little pricing power in the market, higher water prices reduce the profitability of farmers by increasing a key variable cost, other things equal. This impact is bigger for more intensive water users.

[1] IPART 2021, Review of Water NSW's rural bulk water prices - From 1 October 2021 to 30 June 2025: Final Report

2 Vulnerability to water price increases

2.1 Context

Amongst agricultural water users in NSW there are a wide range of farming methods, cost structures, business models and financial outcomes. Some commodities are more water intensive than others, and farms which use irrigation are heavier water users than those relying primarily on rainfall. Data on farm performance and water use allows us to explore the profile of a range of commodity types and regions within NSW.

Water use varies significantly among different market segments.

- Many **broadacre cropping** operations utilise irrigation, with those that do using large amounts of water per hectare. This is particularly true for **cotton** and **rice** producers, who are among the largest bulk water customers in NSW.
- Many **horticulture** producers use irrigation, as demonstrated by the sector's high share of irrigated production. In general, they are less intensive water users though, with lower water use per hectare on average than broadacre cropping customers. However, it is important to note that, of all the agricultural sub-sectors analysed, horticulture covers the most diversity of the crops produced and the farming systems used.
- Water use has been relatively low amongst **livestock** farmers, although irrigation is more widespread in the **dairy** sector specifically.

While water use is a factor in determining the water charges faced by businesses, the two are not perfectly correlated, due to the substantial fixed component of water charges. In 2023/24, around 40% of WaterNSW total bulk water revenues were from fixed access costs, with the remaining 60% based on water use. However, considering the differing levels of water use across farms, the structure of individual farm water bills can vary significantly. For example, the average bill in a sector with low water use sector like livestock will predominantly be fixed access charges, while volumetric charges will be a much more substantial component for an irrigated cropping farm.

The water charges presented in this report will also capture wider water related costs that are not associated with WaterNSW bulk water provision. Large cropping farms often face additional water related charges, for example from the procurement of water from private markets or because they own and manage their own private water facilities. The ABARES data used in this report does not isolate these other water related costs from WaterNSW bulk water charges. In the absence of better data, it is assumed that all water charges are impacted by changes in WaterNSW bulk water prices.

The scenario findings presented in this report should therefore be viewed as a likely upper bound, as in reality less than 100% of water charges would be impacted by higher bulk water prices.

Table 2.1: Irrigation and water use statistics by industry, NSW average since 2015/16

Industry	Average share of annual industry production irrigated (%)	Average annual water use per hectare amongst irrigators (ML/ha)	Average annual water charges per farm ($)
Broadacre cropping	29%	5.26	54,600
of which cotton	91%	7.47	148,400*
of which rice	100%	11.86	69,600*
Horticulture	83%	4.75	13,600
Dairy	52%	2.71	10,300
Beef	7%		
Sheep	4%		

*Estimated based on average irrigated water use per farm in these industries

Source: Deloitte Access Economics (2024) analysis of Gross Value of Irrigated Production (ABS), Water Use on Australian Farms (ABS) and Farm Data Portal (ABARES)

Exposure to water charges varies significantly from year-to-year. Volatility is a fundamental feature of agribusiness, with weather and other factors influencing activity, revenue, and costs. This is especially the case in NSW and Australia, where there is much more variability in seasonal conditions than in other countries. Individual years may see movements in prices, yields and costs of goods sold that have major impacts on the returns earned by farmers. This is particularly true when it comes to water, with seasonal factors playing a key role in supply and demand. As a result, while individual years can be instructive, longer-term averages are important to provide a more robust estimate of the capacity of customers to deal with bulk water price increases.

The subsequent analysis will consider the potential impact that increases in WaterNSW bulk water charges may have on different agriculture market segments in the State. The analysis primarily focusses on two key factors which when combined provide an indication of each market segment's' capacity to absorb higher bulk water charges:

a) **Exposure to water charges:** Higher water charges as a share of total costs indicates that bulk water price increases will have a larger impact on overall farm costs.
b) **Financial capacity to absorb cost increases:** This depends on existing financial performance, with higher margins providing customers greater scope to absorb price increases.

These factors are considered in turn in the rest of this chapter.

2.2 Exposure to water charges

Water charges as a share of total costs has been used to assess the exposure of different market segments to higher bulk water prices. It is important to assess water charges relative to the total cost base of each market segment to provide a consistent basis for comparison between segments and to account for the large share of fixed costs within the agriculture sector.

On average water charges are a small share of total costs in the NSW agriculture sector, but they are more significant among irrigators. Across the NSW broadacre sector, water charges have been just 1.9% of total costs with irrigators facing average charges of 3.1%.

Water charges vary across commodities with certain sectors that are high water users potentially more exposed to water price increases:

- **Broadacre cropping** farmers may be the most exposed to higher bulk water prices with water charges making up 7.2% of total costs on average amongst irrigators in this sector. Bulk water price increases could have a material impact on many customers in this group.

- **Dairy** is a widespread user of irrigation, but it tends to be a less intense water consumer. As a result, water charges have been still a relatively small share of costs, even amongst irrigators in the sector.
- There have been very few irrigators in the **livestock** sector. While those that irrigate in the sector face larger water costs, these are still moderate in the context of other areas of agriculture.

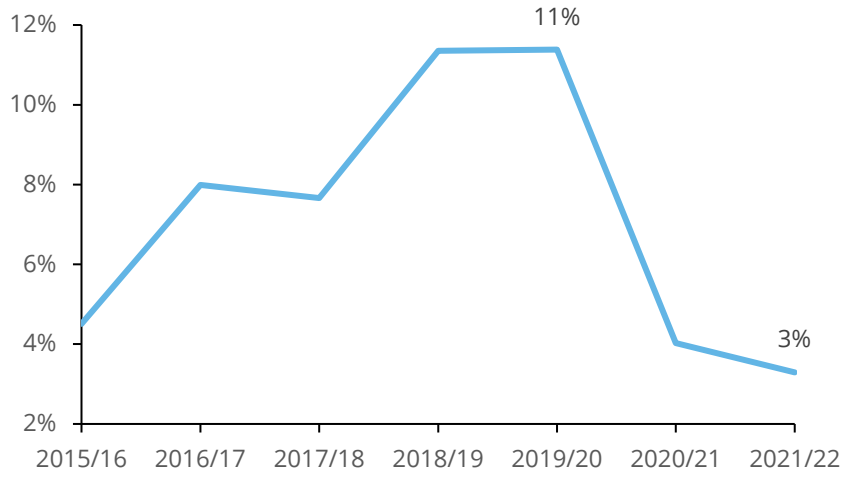
Table 2.2: Water costs as a share of total costs, average of all farms vs irrigators from 2015/16 to 2021/22

Market segment	Average	Irrigators
NSW average	**1.9%**	**3.1%**
Broadacre cropping	5.0%	7.2%
Dairy	1.5%	2.0%
Mixed broadacre	2.1%	4.3%
Beef	0.2%	3.0%
Sheep	0.6%	
Mixed Sheep-Beef	0.4%	

Source: Deloitte Access Economics (2024) analysis of Gross Value of Irrigated Production (ABS), Water Use on Australian Farms (ABS) and Farm Data Portal (ABARES)

These figures are based on historical averages and are volatile year-to-year depending on farming conditions. Considering the irrigated broadacre cropping sector, which is a relatively intense user of water, water costs were just 3.3% of total costs in 2021/22, but 11.4% of total costs in the drought year 2019/20 (Chart 2.1). This highlights the variation in exposure to water costs from year-to-year even within a specific commodity group and shows that in a bad year, even relatively moderate bulk water price increases could have a substantial impact on margins in certain market segments.

Chart 2.1: Water costs as a share of total costs over time, Irrigated broadacre cropping NSW



Source: Deloitte Access Economics (2024) analysis of Gross Value of Irrigated Production (ABS), Water Use on Australian Farms (ABS) and Farm Data Portal (ABARES)

2.3 Capacity to absorb water price increases

In addition to NSW agricultural customers exposure to water price increases, another important factor when considering bulk water price increases is the financial capacity these customers may have to absorb water price increases.

There are many measures that could be used to measure the financial capacity of the agricultural sector to withstand water price increases. Gross margins – the difference between gross income and cost of goods sold in the sector - are a good indicator of this given that water costs are a direct input into this. It is also

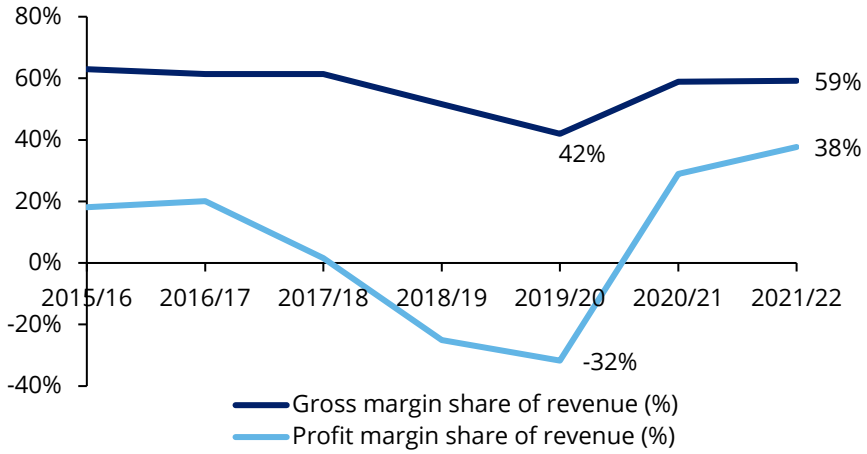
important to consider overall profitability though, as even if gross margins are strong, other costs can still put a business under financial strain. Throughout this section these measures are reported as a share of revenue to allow for reasonable comparisons across markets of different sizes.

2.3.1 Aggregate financial health of the NSW agriculture sector

Gross margins have performed strongly in the NSW agriculture sector since the last IPART review of rural bulk water prices. Low water allocations due to drought and the COVID-19 pandemic reduced gross margins in the sector during 2018/19 and 2019/20; however, they have rebounded well over 2020/21 and 2021/22. While full data is not available yet, it is likely that 2022/23 and 2023/24 were also strong years for the sector due to generally strong yields and high agricultural commodity prices.

While overall agriculture profits in NSW have been high in recent years, historically they have been volatile and substantially lower than gross margins. Profits were 38% of revenue in 2021/22; however, were negative just two years earlier (Chart 2.2). The large gap between gross margins and profits reflects the capital-intensive nature of the agriculture sector and indicates that other factors, particularly fixed costs, are important drivers of overall profitability in the sector. The volatility of profits means that it is important to consider long-term averages when setting bulk water prices. Indeed, in an irrigation reliant sector such as rice, there may be years of no irrigation water and hence no production in some years. Setting prices based on performance in a single good or bad year may be unrepresentative of broader capacity to pay.

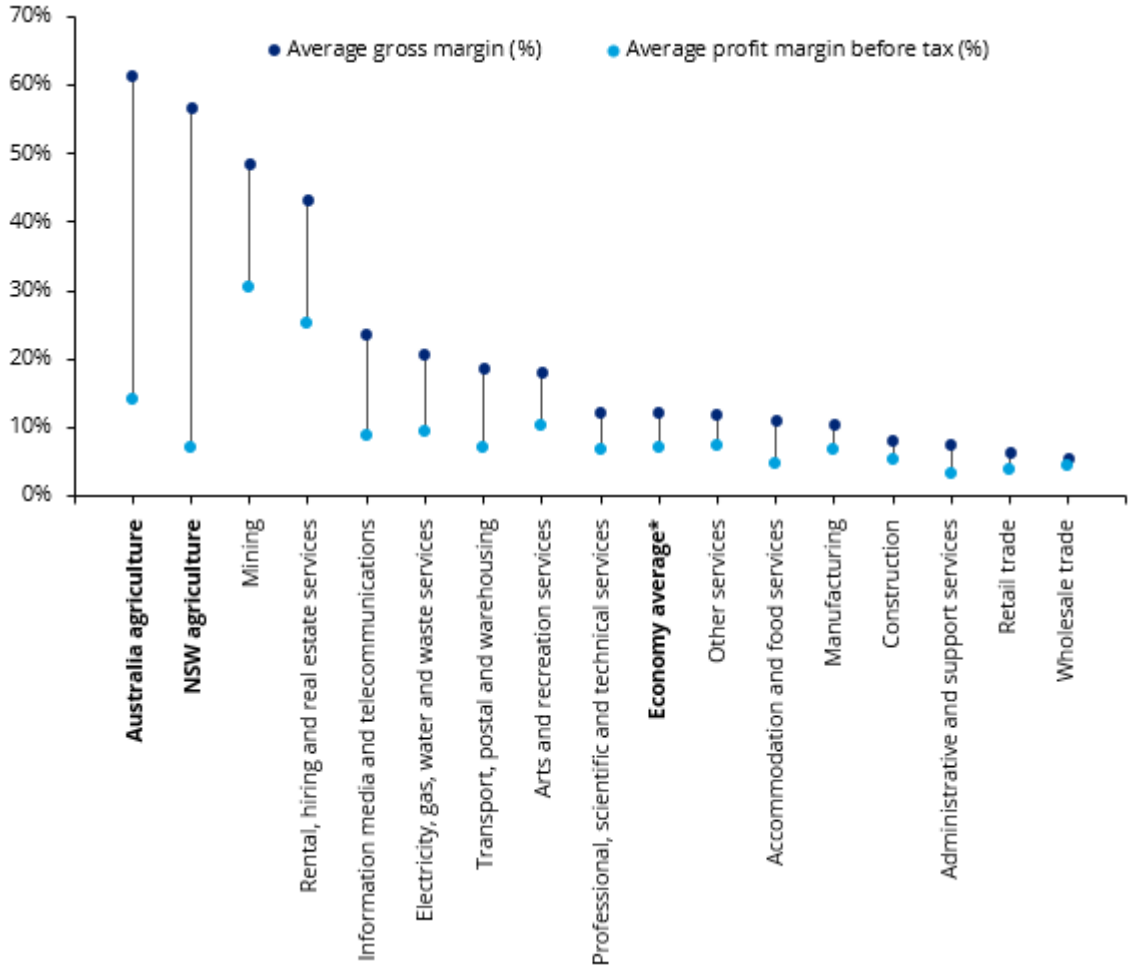
Chart 2.2: Average margins across the NSW agriculture sector over time



Source: Deloitte Access Economics (2024) analysis of Farm Data Portal (ABARES)

While agricultural gross margins are high in the context of other industries, overall profitability is broadly in line with the economy average. Chart 2.3 shows the large gap between gross margins and overall profits in the agriculture sector relative to industries such as Retail trade which have predominantly variable overheads. The moderate profit levels across the agriculture (average profits of 7.1% relative to an economy average of 6.9%) indicate that a detailed analysis of margins by market segment is needed to assess the capacity to pay amongst different customers within the sector.

Chart 2.3: Spread between average gross margin and profit margins by industry in Australia from 2015/16 to 2021/22



*Economy average is based on the median across non-agriculture sectors

Source: Deloitte Access Economics (2024) analysis of Farm Data Portal (ABARES) and Business Indicators, Australia (ABS)

2.3.2 Margins by market segment

Gross margins have been strong across all market segments in the NSW agriculture sector in recent years. As of 2021/22 gross margins were above their historical average across all market segments within the sector. This followed weaker years for certain parts of the sector in 2018/19 and 2019/20.

Considering longer-term trends margins vary considerable across market segments:

- Gross margins and profits have been strongest and most stable in the **broadacre cropping** sector. Cropping margins have been particularly strong in recent years off the back of high yields and strong global commodity prices.
- The **dairy** sector has by far the weakest gross margins, although its overall profitability is closer to the sector average due to the sector's more moderate fixed cost base.
- While **livestock** gross margins are healthy, the overall profitability of the sector has been weak since 2015-16, indicating financial vulnerability in the sector.
- The regional data largely reflects the differences in industry composition between regions, with stronger margins in **Riverina** where broadacre cropping and irrigation are more widespread. In contrast, regions that have relatively large livestock industries like **Coastal** and **Central West** have seen weaker profit margins in recent years.

Table 2.3: Gross margin and profit margin by market segment (% of revenue), average from 2015/16 to 2021/22

Market segment	Gross margin as a share of revenue (%)	Profit margins as a share of revenue (%)
NSW average	56.8%	7.1%
By industry		
Broadacre cropping	58.3%	17.5%
Dairy	47.6%	6.2%
Mixed broadacre	57.5%	8.0%
Beef	52.9%	-5.9%
Sheep	58.5%	4.1%
Mixed Sheep-Beef	57.6%	4.3%
By region		
Riverina	59.7%	15.1%
Far West	63.0%	5.0%
Tablelands (Northern Central and Southern)	54.7%	0.6%
Central West	56.3%	-0.9%
North West Slopes and Plains	51.1%	-7.1%
Coastal	61.7%	-27.4%

Source: Deloitte Access Economics (2024) analysis of Farm Data Portal (ABARES)

2.4 Overall vulnerability to bulk water price increases

Considering both exposure to water costs and capacity to absorb price increases suggests that those most exposed to higher water prices may have greater capacity to absorb price increases.

Broadacre cropping customers are the most intense water users and so are most exposed to price increases. However, the sector has seen relatively strong profit margins, providing some capacity to absorb cost increases. Within the sector, certain high irrigation market segments such as **cotton** and **rice** are likely to be particularly exposed to bulk water price increases.

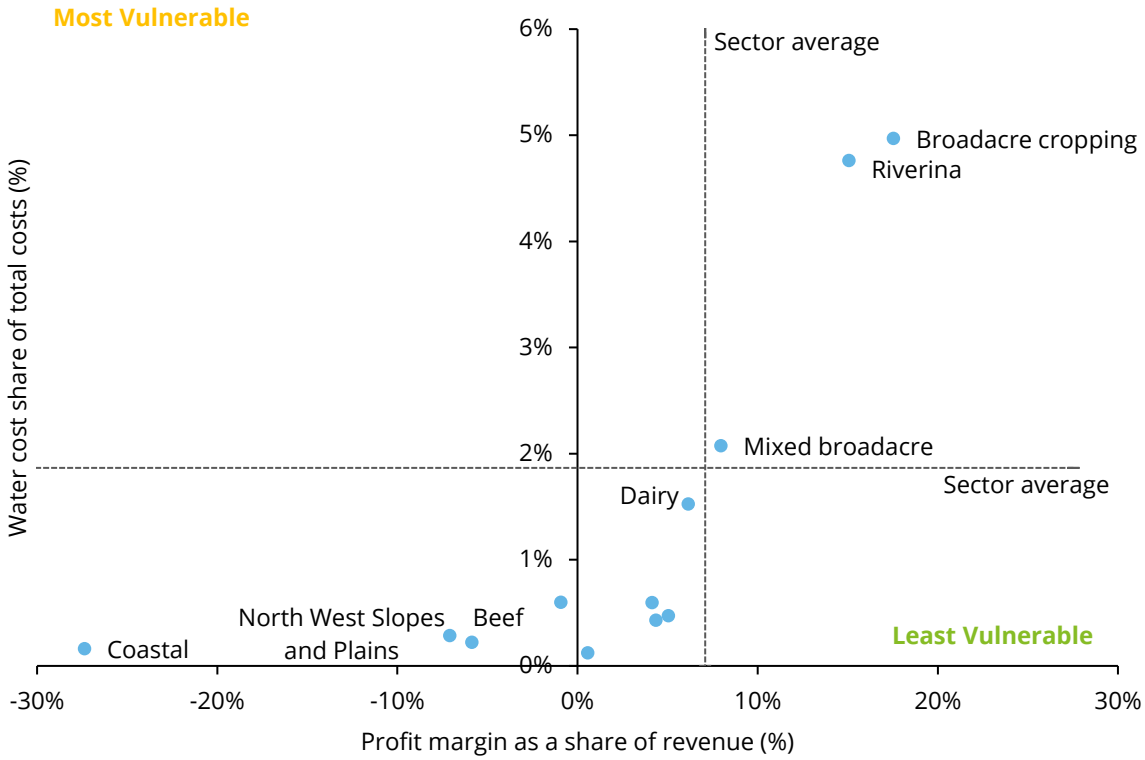
On average, **mixed broadacre** customers are close to the sector average considering both exposure to water costs and profit margins. Vulnerability to bulk water price increases is likely to vary significantly within this sector on a farm-by-farm basis though based on a range of factors including farming mix and irrigation use.

Dairy customers have had profit margins close to the sector average and would be particularly exposed to increases in fixed water charges. While irrigation is practised in the dairy sector, it is a less intense user of water. Given this profile, the average water bill for a dairy farmer is predominantly composed of fixed access charges. Further increases in water access fees could have a material impact on many customers in this customer group; however, increases in volumetric use charges would likely have less impact on the sector.

While **livestock (non dairy)** sector margins are weak, on average its exposure to water charges is very low, which limits the vulnerability of these customers to increased water charges.

The regional analysis broadly reflects the composition and use of irrigation across different parts of NSW. **Riverina** customers are more exposed to water cost increases due to their high use of water for crop irrigation, most notably in rice and increasingly horticulture. Riverina customers have seen strong profit margins though, providing financial headroom. Meanwhile customers in other regions, while financially vulnerable, are far less exposed to bulk water price increases with water costs a much smaller share of overall farm costs.

Chart 2.4: Mapping profit margins against average water costs by market segment from 2015/16 to 2021/22



Note: Chart is based on averages from 2015/16 – 2021/22. Only outlying market segments are labelled.
Source: Deloitte Access Economics (2024) analysis of Farm Data Portal (ABARES)

3 Wider factors impacting profitability and firm viability

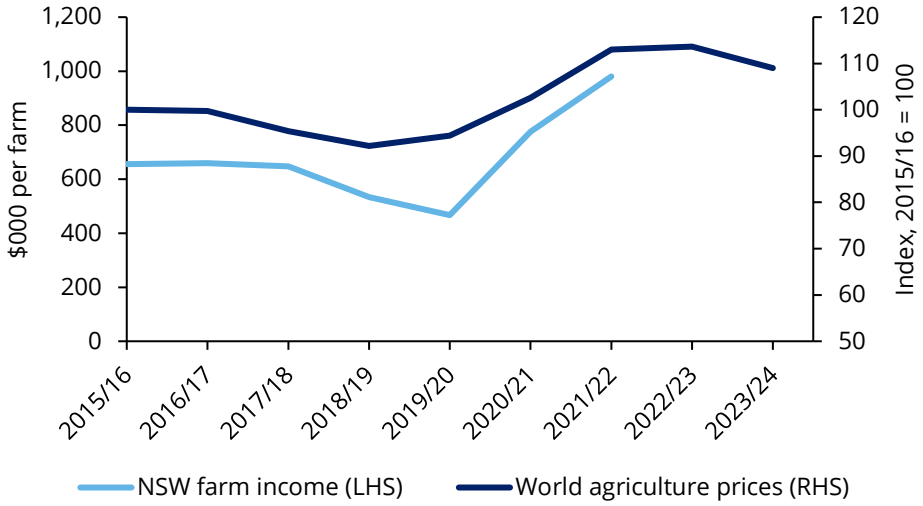
Water costs are just one component of the picture when it comes to measuring the profitability of the agriculture sector, while profitability itself is one of many factors that influence the financial viability of a firm.

3.1 Revenue

Revenue can be impacted by volume and price effects and directly feeds into gross margins and profits. While volume effects on revenue will have a limited impact on overall gross margins as cost of goods sold will scale proportionately, larger production volumes will boost overall profitability by impacting the relative size of a farm's fixed cost base. Price effects on revenue can have a significant impact on gross margins and profitability though by increasing or decreasing farm returns on a fixed cost base.

The strong performance of revenue in the agriculture sector in 2020/21 and 2021/22 was driven by a combination of price and volume factors. While climate conditions were favourable for production volumes, strong global agriculture prices also helped boost farm income (Chart 3.1). While global market conditions have since moderated slightly in 2023/24, on average they remain favourable, which is expected to support agriculture margins and profitability.

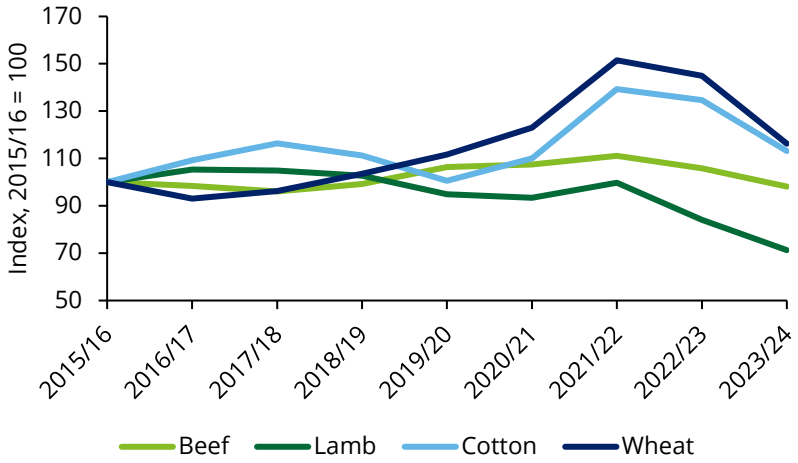
Chart 3.1: NSW farm income vs global agriculture prices



Source: Farm Data Portal (ABARES, 2024), World Bank Commodity Price Data (2024)

Considering major Australian agricultural exports, global prices have been particularly favourable in cropping commodities in recent years. Cotton and wheat prices have outperformed livestock prices since 2015/16, which will be a large factor behind the relatively strong margins and profitability in this industry. While cropping prices have normalised slightly since 2021/22, they remain relatively favourable indicating that the sector should have a relatively stronger ability to absorb higher costs.

Chart 3.2: Global prices of selected Australian agricultural export commodities (US$)



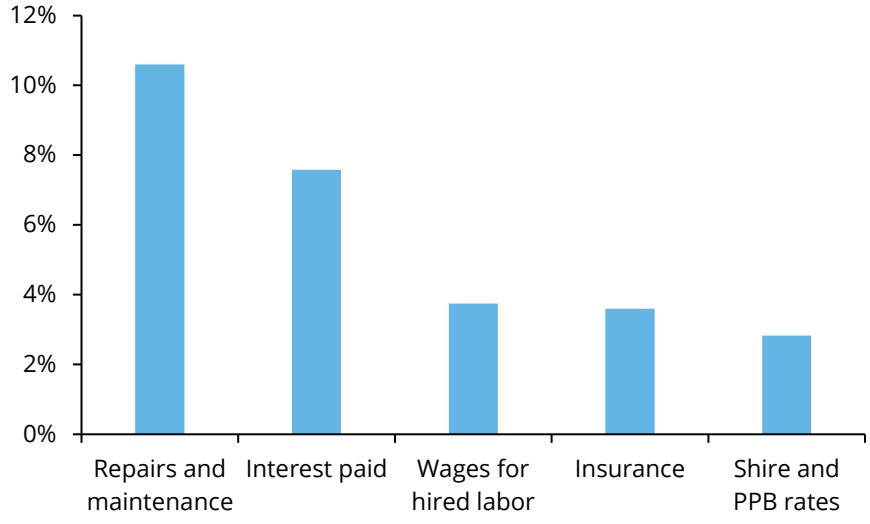
Source: World Bank Commodity Price Data (2024)

3.2 Fixed costs

While farmers can generally manage costs of goods sold in line with year-to-year changes in production volumes, there are other costs of running a farm that are not directly linked to the quantity of output. These fixed costs impact on farm profitability and income but are harder to avoid when growing conditions are less favourable.

Other than interest costs, most of the agriculture sector's largest fixed costs items are relatively stable over time. Repair and maintenance is the largest fixed cost category for agriculture businesses followed by interest costs and wages. Debt financing is common in the agricultural sector, so interest costs are a major component of total costs for the average farmer in NSW. Looking over time most fixed costs have been a relatively stable share of total farm costs, other than these interest costs.

Chart 3.3: Top fixed costs across the NSW agriculture sector, average from 2015/16 to 2021/22

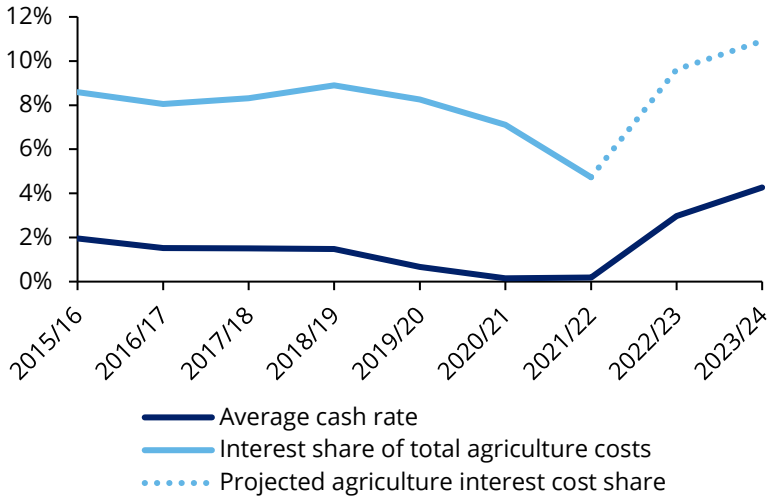


Source: Deloitte Access Economics (2024) analysis of Farm Data Portal (ABARES)

Over time interest costs have tended to follow movements in interest rates, with low rates over the COVID period reducing interest costs as a share of the total. Interest rates have been rising rapidly in more recent times though, meaning that this component of costs is likely to have increased for many farmers. Historically the mark-up of farm interest costs over the Reserve Bank of Australia cash rate has been

relatively stable over time. If it is assumed that this relationship has held in more recent years, analysis suggests that the farm interest cost burden may have more than doubled since 2021/22, rising from 4.7% to 10.9% of total costs (Chart 3.4). With this major fixed cost line increasing, other things equal, gross margins would need to increase to maintain overall profitability.

Chart 3.4: NSW agriculture interest costs vs the cash rate over time



Source: Deloitte Access Economics (2024) analysis of Farm Data Portal (ABARES), Reserve Bank of Australia (2024)

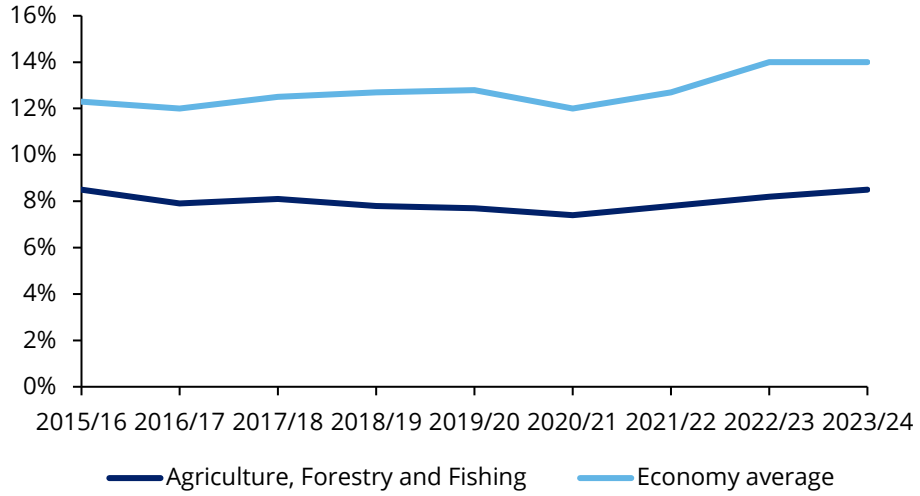
3.3 Firm viability

While longer term profitability is fundamental to the overall viability of an agricultural firm there are other factors which may lead to financial distress. Year-to-year volatility in both cash flows and profits can be a fact of life in the sector. As a result, in the long-run agriculture businesses likely require a premium on what might be considered a reasonable profit margin for the rest of the economy to account for higher levels of risk.

While profit can help agricultural businesses manage cash flow, it is not a guarantee of firm viability. Profitable businesses can fail if cash flow management is poor. This can happen in good years if the timing of cash income doesn't align with the timing of large outgoings, or money is taken out of the business. It is a particular risk in bad years though if cash buffers have not been managed sufficiently well in previous years.

Low firm exit rates in the agriculture sector suggest that profit margins and cash flow have been strong enough in recent years to make the average farm viable. Exit rates (the percentage of businesses exiting an industry as a share of all businesses) in the agriculture industry have been the lowest of all industries across the economy in recent years at between 7-9% per year. This suggests that only the least well managed farming businesses have been leaving the industry.

Chart 3.5: Exit rates in Agriculture, forestry and fishing vs the whole economy, Australia



Source: Counts of Australian Businesses, including Entries and Exits (ABS, 2024)

4 Scenario analysis

This chapter explores the expected impact of a range of bulk water price increases on profit margins in the agricultural sector. It illustrates the profit margins of different segments of the bulk water market if price increases were to flow through to cost of goods sold.

In the modelled scenarios both fixed and volumetric prices increase, with fixed charges remaining the same share of overall water charges. All regions see the same percentage price increase in each scenario. The scenarios assume that all other costs increase in line with inflation and that there is no change to the level of production or bulk water demand.

In practice factors other than water prices such as changes in input costs, farming methods and conditions and farm gate prices for produce would result in substantial movements in gross margins from year-to-year. It is also important to note that decisions by farmers in response to higher prices may well result in reduced water demand, lower production and improved margins relative to the scenario case, meaning the results presented here represent a conservative assessment.

In the absence of detailed financial information for irrigators we have assumed that:

- Water charges for irrigators reflect the averages presented in Chapter 2.
- Total costs of goods sold and measures of profitability are the same as those for the average farmer in the baseline.

The scenarios modelled see bulk water charges increase by inflation plus 5%, 10%, 15% and 20%. These are compared against a baseline for each market segment of the historical average since 2015/16.

The results presented in these scenarios should be viewed as a likely upper bound for the average farm. As outlined in Chapter 2 the water charges line in ABARES does not isolate WaterNSW bulk water costs from other water related farm costs. In the absence of better data to separate out WaterNSW costs it has been assumed that 100% of water charges in ABARES are impacted in the scenarios, but in reality the actual figure would be less than 100%. The results also reflect sector averages though, and within each group there would be farms that are impacted by more or less than the average based on a range of factors.

4.1 Aggregate impacts

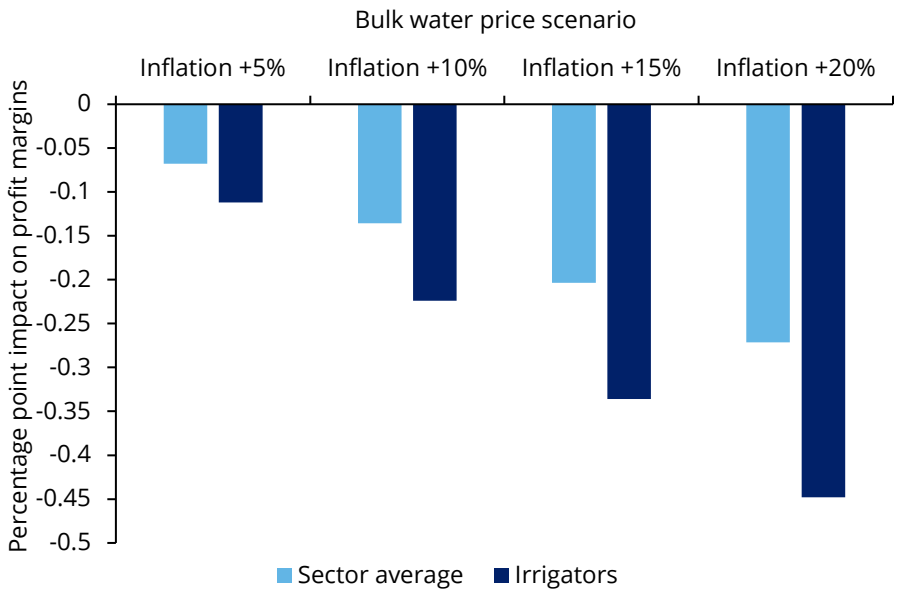
Under each of the price scenarios, water costs rise leading to reductions in gross margin and ultimately profit. For the average broadacre farm these reductions are small though.

In the 15% price increase scenario the average farm profit margin falls by 0.2 percentage points from 7.1% to 6.9%. This still leaves average profit margins in the sector in line with the median across the economy. This indicates that while there is capacity for the average farming business to absorb price increases of up to inflation plus 15%, it would erode the safeguards that above average profit margins provide, reducing farm viability.

The greater exposure to water costs among irrigators means that higher prices are more likely to reduce financial viability in this group. Irrigators face a greater reduction in profit margins across all price scenarios. In the 15% scenario irrigators would experience a fall in profit margins of 0.36 percentage points – over 1.5 times the sector average. This would bring the average profit margins amongst irrigators down to 6.8%, slightly below the economy average.

The impacts on marginal irrigators could be mitigated by focusing water price increases on volumetric water use rather than access fees. The low margins amongst irrigators are focused on the dairy sector where there are many irrigators using relatively little water. Profit margins for these customers are estimated to fall to 5.9% in the 15% price scenario. In contrast profit margins amongst heavy water users in the irrigated broadacre cropping sector are estimated to remain well above the economy average in the 15% price scenario.

Chart 4.1: Percentage point impact on profit margins by water price scenario, Irrigators vs sector average



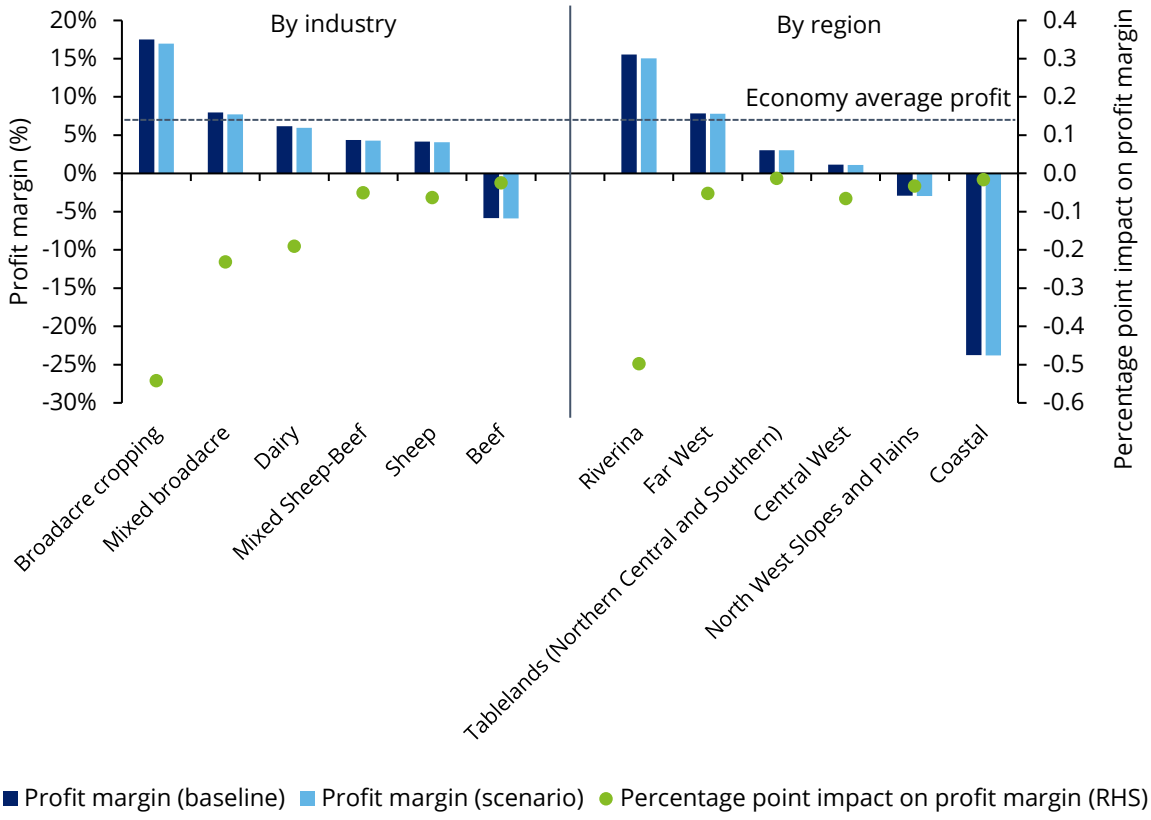
Source: Deloitte Access Economics (2024) analysis of Gross Value of Irrigated Production (ABS), Water Use on Australian Farms (ABS) and Farm Data Portal (ABARES)

4.2 Variation across market segments

As Chapter 2 notes, vulnerability to water price increases depends largely on the combination of exposure to water charges and underlying levels of profitability. Those factors vary across the market segments identified in the data. More intensive water users see greater reductions in gross margin, while those with lower levels of profitability are more vulnerable to those reductions. In the 15% price scenario:

- **Broadacre cropping** is the most exposed industry. It is expected to see profit margins fall by 0.5 percentage points, representing a 3.1% share of existing profits. Overall broadacre profit margins remain very healthy relative to other agriculture sectors and in the context of the wider economy though at 17.0%.
- Similarly, farmers in the **Riverina** may see a 0.5 percentage point fall in profit margins, but only a 3.2% fall in relative terms. Again, profit margins in this more exposed sector remain strong at 15.1%.
- In the **mixed broadacre** industry profit margins are expected to fall by 0.23 percentage points, or 2.9% of existing profit margins. At 7.7% though, estimated profit margins remain above the economy average profit margin of 6.9%.
- The **dairy** industry is in a weak position in the baseline which deteriorates further with profit margins in the sector falling by 0.19 percentage points, or 3.1% of existing profit margins.
- The impacts of water price increases on the **livestock** sector are minimal, although this sector already has weak profit margins relative to the economy average.

Chart 4.2: Impact of inflation plus 15% bulk price increase on profit margins by market segment



Source: Deloitte Access Economics (2024) analysis of Farm Data Portal (ABARES)

It is important to note that individual farmer's experience of both water costs and profitability will vary considerably from the averages presented in these scenarios. Marginal operations are more likely to encounter financial difficulty as the average gross margin falls, but even relatively healthy averages can include individual cases where farms are no longer viable.

5 Key caveats and limitations

The key datasets that have been used in this analysis are internally consistent and provide insights into the profitability of the agricultural sector and key market segments as well as key components of cost.

Publicly available data on the agricultural sector is limited though, with the data often being lagged or containing gaps for key market segments. As a result, there are some key caveats and limitations to the analysis that should be considered when interpreting the results in this report. These limitations would be difficult to overcome without further, targeted data collection from within the sector.

- **The coverage of the available data across different commodity groups is varied.** There is much richer data on the broadacre commodities covered by the ABARES Data Portal including cropping, dairy and livestock categories. However, there are some commodities which are not identified in the ABARES data – particularly horticulture – where good quality data is extremely limited.
- **A lack of data on financial performance and water cost differences between irrigators and non-irrigators means that assumptions are necessary, and so the data for irrigators has greater uncertainty.** It has been assumed that fixed charges as determined by WaterNSW bulk water revenues from entitlements are spread equally across all farms. The remaining WaterNSW bulk water revenues that are based on volumetric use are then split based on data on the percentage of water use by irrigators and non-irrigators. The scenario analysis also assumes that total costs of goods sold and other measures of profitability are the same for irrigators as for the average farmer in the sector due to a lack of data on the profitability and cost structures of irrigators.
- **The water charges presented in this report will capture wider water related costs that are not associated with WaterNSW bulk water provision.** The ABARES data used in this report does not isolate WaterNSW bulk water costs from other water related costs faced by farms. In the absence of better data, it is assumed that all water charges faced by farms are impacted by changes in WaterNSW bulk water prices. Therefore, the scenario findings presented in this report should be viewed as a likely upper bound, as in reality less than 100% of water charges would be impacted by higher bulk water prices.
- **Some costs are difficult to allocate between cost of goods sold and fixed costs.** This means that comparisons of gross margins to the broader economy should be done with caution. This does not influence measures of overall profitability though which are common across sectors.
- **The scope of this analysis only considers agricultural customers.** Some smaller WaterNSW bulk water users are not covered by this. For example, local government and mining customers.
- **The datasets used for this analysis largely use survey data.** As such there is a risk that the datasets may contain internal inconsistencies due to differences in accounting treatment across respondents.
- **The regions included in this analysis don't directly match up with WaterNSW's valleys**. The data available is reported based on ABARES regional splits.
- **Throughout the report the figures presented are based on the average farm in the given sector**. Financial performance can vary greatly across individual farms and within each region and industry there will be farms that are more or less vulnerable to higher bulk water prices.

Annex A: Detailed data tables

Table A.1: Water costs share of total costs by market segment, historical data

	Water charges as a share of total costs (%)							
Market segment	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**Average**
All broadacre								
NSW sector average	1.5%	2.2%	2.1%	2.4%	1.9%	1.6%	1.3%	**1.9%**
Irrigators	2.5%	4.0%	3.9%	4.0%	2.8%	2.5%	2.2%	**3.1%**
By industry								
Beef	0.2%	0.2%	0.2%	0.1%	0.1%	0.5%	0.2%	**0.2%**
Broadacre cropping	3.1%	5.2%	4.8%	7.9%	8.9%	2.7%	2.1%	**5.0%**
Dairy	1.9%	1.7%	1.5%	2.3%	1.3%	1.3%	0.7%	**1.5%**
Mixed broadacre	1.5%	1.5%	2.5%	2.9%	2.7%	2.0%	1.4%	**2.1%**
Sheep	0.3%	0.6%	0.5%	1.0%	0.4%	1.0%	0.3%	**0.6%**
Mixed Sheep-Beef	0.2%	0.2%	0.4%	0.7%	0.9%	0.1%	0.5%	**0.4%**
By region								
Central West	0.5%	0.5%	0.8%	0.9%	0.6%	0.4%	0.5%	**0.6%**
Coastal	0.1%	0.2%	0.0%	0.2%	0.0%	0.1%	0.6%	**0.2%**
Far West	0.2%	0.4%	0.7%	1.0%	0.5%	0.5%	0.1%	**0.5%**
North West Slopes and Plains	0.3%	0.2%	0.3%	0.6%	0.1%	0.1%	0.4%	**0.3%**
Riverina	3.9%	6.2%	5.1%	5.9%	5.0%	4.2%	3.1%	**4.8%**
Tablelands (Northern Central and Southern)	0.1%	0.1%	0.0%	0.0%	0.2%	0.3%	0.2%	**0.1%**

Source: Deloitte Access Economics (2024) analysis of Gross Value of Irrigated Production (ABS), Water Use on Australian Farms (ABS) and Farm Data Portal (ABARES)

Table A.2: Gross margin as a share of revenue by market segment, historical data

	Gross margin as a share of revenue (%)							
Market segment	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**Average**
All broadacre								
NSW sector average	63%	61%	61%	52%	42%	59%	59%	**56.8%**
By industry								
Beef	68%	61%	63%	47%	24%	51%	57%	**52.9%**
Broadacre cropping	59%	57%	60%	58%	54%	60%	61%	**58.3%**
Dairy	49%	51%	49%	41%	41%	49%	52%	**47.6%**
Mixed broadacre	63%	62%	60%	52%	46%	61%	58%	**57.5%**
Sheep	60%	64%	61%	52%	50%	61%	61%	**58.5%**
Mixed Sheep-Beef	67%	68%	65%	47%	38%	59%	59%	**57.6%**
By region								
Central West	61%	65%	62%	51%	41%	59%	60%	**56.3%**
Coastal	61%	64%	57%	55%	54%	67%	73%	**61.7%**
Far West	68%	69%	68%	45%	61%	67%	69%	**63.0%**
North West Slopes and Plains	64%	60%	66%	46%	19%	57%	59%	**51.1%**
Riverina	63%	63%	60%	59%	56%	62%	58%	**59.7%**
Tablelands (Northern Central and Southern)	68%	64%	65%	52%	28%	59%	62%	**54.7%**

Source: Deloitte Access Economics (2024) analysis of Gross Value of Irrigated Production (ABS), Water Use on Australian Farms (ABS) and Farm Data Portal (ABARES)

Table A.3: Profit margin as a share of revenue by market segment, historical data

	Profit margin as a share of revenue (%)							
Market segment	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**Average**
All broadacre								
NSW sector average	18%	20%	2%	-25%	-32%	29%	38%	**7.1%**
By industry								
Beef	14%	15%	-2%	-53%	-64%	18%	32%	**-5.9%**
Broadacre cropping	24%	24%	7%	-8%	-7%	36%	46%	**17.5%**
Dairy	6%	6%	4%	-4%	1%	13%	17%	**6.2%**
Mixed broadacre	18%	21%	1%	-26%	-30%	33%	38%	**8.0%**
Sheep	8%	15%	-6%	-19%	-14%	25%	20%	**4.1%**
Mixed Sheep-Beef	18%	20%	4%	-24%	-40%	20%	32%	**4.3%**
By region								
Central West	14%	15%	-6%	-31%	-48%	35%	30%	**-0.9%**
Coastal	-2%	-4%	-36%	-67%	-55%	-2%	-1%	**-27.4%**
Far West	25%	31%	-15%	-57%	-9%	37%	44%	**5.0%**
North West Slopes and Plains	22%	30%	-1%	-60%	-87%	31%	46%	**-7.1%**
Riverina	18%	18%	8%	-2%	-1%	31%	37%	**15.1%**
Tablelands (Northern Central and Southern)	18%	16%	10%	-26%	-51%	17%	38%	**0.6%**

Source: Deloitte Access Economics (2024) analysis of Gross Value of Irrigated Production (ABS), Water Use on Australian Farms (ABS) and Farm Data Portal (ABARES)

Annex B: Methodology

A.1. Data sources

The key data sources used for estimating the income, expenses and water use of farms included:

- **ABARES**
  - National Farm Data: Historical State Estimates
  - National Farm Data: Historical Regional Estimates
  - Murray-Darling Basin Irrigators' Survey
- **ABS**
  - Gross Value of Irrigated Agricultural Production
  - Water Use on Australian Farms
- **WaterNSW**
  - Revenue and pricing data

A.1.1. ABARES

The ABARES Farm Data Portal contains national farm data, produced using modelled results from ABARES surveys of broadacre and dairy farms. The analysis uses the financial performance metrics for New South Wales farms, available at either the sub-region or industry-level (but not both).

The 'Historical State Estimates' file listed on the Farm Data Portal contains estimated averages of individual inventory, revenue and cost items for farms, split by state and industry. This data was used to inform data tables comparing the financial performance of farms across the following industries:

- All broadacre (Average across all farm industries)
- Beef (Beef cattle farming)
- Cropping (All broadacre cropping, including rice and other grains)
- Dairy (Dairy cattle farming)
- Mixed (Grain-sheep and grain-beef cattle farming)
- Sheep (Sheep farming)
- Sheep-Beef (Mixed sheep and beef cattle farming)

This data was used to inform data tables comparing the financial performance of farms across industries.

Similarly, the 'Historical Regional Estimates' file contains values for items broken down into each state subregion. These subregions are based on definitions from the Australian Agricultural and Grazing Industries Survey (AAGIS) for New South Wales:

- Central West
- Coastal
- Far West
- North West Slopes and Plains
- Riverina
- Tablelands (Northern Central and Southern)

This data was used to inform data tables comparing the financial performance of farms across regions. However, these regions do not map directly to the WaterNSW valleys, so understanding variance in farm performance across water valleys and catchments requires a concordance of the data, either based on population, farm employment or farm output.

Since ABARES does not provide a breakdown of region by industry, it is not possible to estimate the financial performance of farms in specific regions at a more granular level without knowing the distribution of farms in specific industries across regions.

In terms of timeframes, the ABARES Farm Data Portal provides statistics up to the 2021-22 financial year, so the findings from the analysis are most relevant to that period. While it is not expected that there will have

been significant changes to farm financial performance over the past two years based on prevailing agricultural conditions, some variation should be expected.

A.1.2. ABS

Specific data series from the Australian Bureau of Statistics were used to estimate financial performance for irrigators and non-irrigators, as well as understanding water usage on farms. The Gross Value of Irrigated Agricultural Production (GVIAP) catalogue breaks down irrigated production for selected commodities and by region. This data is used to estimate the expected revenue and costs for irrigated farms in specific industries, with specific weighting used to adjust for the differences in water charges expected for irrigators as opposed to non-irrigators.

The Water Use on Australian Farms catalogue is relied upon to calculate the volume of water used (ML) by farms, particularly by irrigators. Water use is reported in ML/ha for all years except for the 2020-21 financial year, for which the total water volume was divided by the area watered to provide a ML/ha proxy measure.

The key concern regarding the data sourced from the ABS is the discontinuation of both the above catalogues. The last GVIAP release was for the 2017-18 financial year, and the last data for Water Use on Australian Farms was released for the 2020-21 financial year. Consequently, the data underpinning the analysis is dated, and given seasonal variation in agricultural production, it would be difficult to accurately scale the data up to the 2023-24 financial year.

A.1.3. WaterNSW

Data provided by WaterNSW has been used to understand break down fixed and variable components of water charges, represented by entitlement charges and usage charges respectively. It has been assumed that fixed charges as determined by WaterNSW bulk water revenues from entitlements are spread equally across all farms. The remaining WaterNSW bulk water revenues that are based on volumetric use are then split based on data on the percentage of water use by irrigators and non-irrigators. The scenario analysis also assumes that total costs of goods sold and other measures of profitability are the same for irrigators as for the average farmer in the sector due to a lack of data on the profitability and cost structures of irrigators.

A.2. Methodology

A.2.1. Water price exposure analysis

To best understand the susceptibility of customers to higher water prices, this analysis identified the following variables as the most important indicators of a farm's financial performance:

- Cost of goods sold
- Gross margin
- Water charges as a share of cost of goods sold
- Water charges as a share of total costs
- Business profit margin

An explanation and methodology for calculating each of these items is listed below. A key caveat to note is the high degree of variability between farms, particularly the livestock and broadacre cropping categories, which has created difficulty in comparing financial performance across industries, and complicated the process of determining sector-wide averages.

- **Cost of goods sold** are those costs directly attributable to a farm which are subject to variation on an annual basis based on production levels.
- The **gross margin** for a business is calculated as the difference between total farm income and cost of goods sold as a proportion of total farm income. It excludes fixed and overhead costs such as depreciation, interest payments, rates and permanent labour. The gross margin is a useful measure to gauge the relative profitability of a farm when compared to other similar enterprises.
- Estimating **water charges as a share of costs** is necessary to understand to what extent a change in water prices will affect farm profitability. These proportions were estimated by calculating water charges as a proportion of cost of goods sold, and then total costs overall, noting that water costs are themselves categorised as a cost of goods sold.

- An enterprise's **profit margin** is its profitability after accounting for all possible revenue and cost streams, presented as farm business profit as a share of total farm income. The farm business profit is the final profit for the farm, calculated by adding the value of build-up in trading stocks to total farm income, and subtracting payments for depreciation and the imputed value of owner and family labour.

A.2.2. Irrigator and non-irrigator financial performance

The ABARES National Farm Data presents the financial performance for the average farm, but does not provide detail regarding irrigation status. To estimate irrigator costs, the ABS GVIAP data was used, with the value of items for the average farm scaled up according to the irrigated share of agricultural production by industry, as seen in Table A.1.

Table A.1: Proportion of irrigated and non-irrigated agricultural production, by ABARES industry (2017-18)

Industry	Gross value of irrigated production ($)	Gross value of agricultural production ($)	Share of irrigated production (%)	Share of non-irrigated production
Beef	168,887,482	2,387,243,142	7.1	92.9
Cropping	2,096,390,651	4,827,921,220	43.4	56.6
Dairy	317,984,317	566,223,309	56.2	43.8
Mixed	2,715,311,283	11,329,607,821	24.0	76.0
Sheep	132,048,833	3,548,220,149	3.7	96.3
Sheep-Beef	300,936,314	5,935,463,291	5.1	94.9
All Broadacre	2,715,311,283	11,329,607,821	24.0	76.0

Source: Gross Value of Irrigated Agricultural Production (ABS, 2019).

Water use for non-irrigators was sourced from the data provided by WaterNSW, and this was used to estimate the expected water charges paid at non-irrigated farms. The water charges for irrigators were then calculated based on the share of irrigated agricultural production, given the below relationship:

$$Average\ water\ charge = (Irrigated\ water\ charge * share\ of\ irrigated\ production) + (Non-irrigated\ water\ charge * share\ of\ non-irrigated\ production)$$

The estimated water charges were also revised after receiving data from WaterNSW, which was used to break down the entitlement costs and water usage costs components of the water charges. These shares were used to update the non-irrigator water charges, from which the water charges for irrigators were calculated, again using the above equation.

Notably, total costs and variable costs were assumed to be the same across irrigators and non-irrigators. This enabled the analysis to isolate the effects of changes in water charges and focus on implications for farm profitability, particularly when developing the scenario analysis.

A.2.3. Scenario analysis

Scenarios in Chapter 4 explore the impact of changes in rural bulk water prices on measures of profitability for farmers.

They are based on key costs and revenues:

- Water charges
- Variable costs
- Total costs
- Total revenue

Baseline values for these are drawn from the analysis underlying Chapter 2. This provides both gross margin and profit margin in the baseline.

In the modelled scenarios both fixed and volumetric prices increase, with fixed charges remaining the same share of overall water charges. All regions see the same percentage price increase in each scenario. The scenarios assume that all other costs increase in line with inflation and that there is no change to the level of production or bulk water demand.

In practice factors other than water prices such as changes in input costs, farming methods and conditions and farm gate prices for produce would result in substantial movements in gross margins from year-to-year. It is also important to note that decisions by farmers in response to higher prices may well result in reduced water demand, lower production and improved margins relative to the scenario case, meaning the results presented here represent a conservative assessment.

In the absence of detailed financial information for irrigators we have assumed that:

- Water charges for irrigators reflect the averages presented in Chapter 2.
- Total costs of goods sold and measures of profitability are the same as those for the average farmer in the baseline.

Changes in water charges flow through directly to both variable costs and total costs. Gross margin and profit margin are then recalculated based on the scenario costs and revenues.

The scenarios should be viewed as a likely upper bound for the average farm. As outlined in Chapter 2 the water charges line in ABARES does not isolate WaterNSW bulk water costs from other water related farm costs. In the absence of better data to separate out WaterNSW costs it has been assumed that 100% of water charges in ABARES are impacted in the scenarios, but in reality the actual figure would be less than 100%. The results also reflect sector averages though, and within each group there would be farms that are impacted by more or less than this based on a range of factors.

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