



REPORT

Rice vesting economic evaluation

Economic evaluation of the costs and benefits

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NSW Productivity Commission
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Abbreviations

A-UK FTA	Australia United Kingdom Free Trade Agreement
ABF	Australian Border Force
CIE	Centre for International Economics
CIF	Cost-insurance-freight
FOB	Free-on-board
FSA	Freight scale advantage
GTA	Grant Thornton Australia
MIA	Murray Irrigation Area
NSW DPI	NSW Department of Primary Industries
NSW PC	NSW Productivity Commission
RMB	Rice Marketing Board
RGA	Ricegrowers Association
SEEL	Sole and Exclusive Export Licence
SunRice	Trading as Ricegrowers Limited
TOR	Terms of reference

Executive summary

This evaluation

The NSW Productivity Commission is undertaking an economic evaluation of the costs and benefits of the rice vesting export arrangement for rice grown in New South Wales. This evaluation will be an input to the 2021 NSW Government review of rice vesting (the Review) undertaken by the NSW Department of Primary Industries (DPI).

To inform this evaluation, the CIE have:

- attended 39 separate meetings and workshops during the consultation that included engagement with 22 stakeholders who were contacted outside of the NSW DPI Rice Vesting review, including growers and industry representatives across regional NSW
- reviewed available data and evidence, including previous rice vesting reviews and evaluations of single export desks for other commodities
- sought data and information from industry stakeholders, and compiled a comprehensive data set on the NSW rice industry and trade in rice
- based on information obtained from the consultation, developed scenarios around what could happen with and without regulation — in terms of the potential for the NSW rice industry to expand, innovate and compete in domestic and export markets
- estimated benefits and costs using an economic model which was specifically developed for the evaluation which recognised key interdependencies between production regions and markets.

The rice industry is important in NSW regional areas

In normal production years, the vast majority (over 90 per cent) of Australia's rice is grown in New South Wales. The NSW rice industry is located across two separate regions of the state:

- the Riverina/Murray region is located in southern NSW across three irrigation areas
- the Northern Rivers industry is in hinterland of northern coastal NSW and is rainfed.

In the Riverina/Murray region, rice-growing competes directly with a range of annual and permanent crops for both land and water.

- Paddy production experiences large variations in line with irrigation availability. There has been a distinct downward trend in the production of paddy, culminating 45 kt of paddy for the 2020 crop year compared to the peak of production (over 1 500 kt) in 2001.
- The consultation indicated that the grower base is changing from a core of dedicated growers, who are less likely to trade water, to younger and corporate players whose decisions are more driven by enterprise gross margins per megalitre and taking trading water opportunities.

In the Northern Rivers production region, rice is not irrigated and provides another cropping option especially when paddocks are waterlogged. Because production is rainfed, there also can be large variations in yields and therefore production.

- Rather than being a large-scale commodity style supply chain, this region focuses on differentiated product, based on its sustainability credentials.

Regulatory framework

The regulatory framework provided for under the *Rice Marketing Act 1983* (NSW) includes two key and inter-related components:

- All rice in New South Wales is vested in, and therefore is the property of, the Rice Marketing Board (RMB). This vesting is associated with a wide range of supply chain controls that include: the licencing of domestic buyers and restrictions on storage and handling of rice.
- the RMB awards the Sole and Exclusive Export Licence (SEEL) which provides the holder exclusive rights to export NSW grown rice:
 - SunRice has been awarded the SEEL since 2006 and has a close working relationship with the RMB and the Ricegrowers Association (RGA).
 - The current SEEL is due to expire on 30 June 2022.

The RMB is Australia's only remaining example of a statutory single-desk marketing board. Separate to this regulatory framework, the SEEL holder currently coordinates the production and distribution of seed for the southern industry, as well as some varieties sold to the Northern Rivers industry, as well as being a joint owner of the Plant Breeders Rights for a number of commercially-significant varieties used in both regions.

NSW rice competes in a dynamic and evolving global market

Over the past 10 years, NSW export volumes have been determined by the level of paddy production in the Riverina/Murray region — which in-turn depends on irrigation availability.

- Over this period, NSW rice has been exported to over 60 separate markets, however, the majority of the exports are focused on the Pacific region, the Middle East and New Zealand. The domestic market is also an important component of the overall sales picture for NSW rice and cannot be excluded from any analysis.
- Analysis of export data has shown that with decreasing export volumes of NSW rice, exports have retracted to the high-value markets. In traditional markets for NSW rice, such as those in the Pacific, NSW rice has been replaced with product sourced from other countries.
- There has been strong growth in average export prices in Australian dollar terms over the period — which are attributable to several factors including exchange rate changes, the higher costs of production driven by the availability of water, the transition from bulk to packaged product and the greater use of branding and market positioning.

- This strategy is in-line with the global rice market that has moved from a commodity to a differentiated product focus — in a market that is increasingly dominated by diverse multinational companies and branded product.
- The SEEL holder is a food multinational who has a diverse business and sales base — which enables it to compete in the global market.

Diversity of views from the industry consultation

There were a range of views put forward in consultations. On the one hand:

- the majority of ricegrowers in the southern industry support the current arrangements and SunRice holding the SEEL
- a common view was that without the single export desk, SunRice would not be able to function commercially as it does now, with significant impacts on the incomes of ricegrowers and flow-on impacts to the communities in the Riverina and the Murray.

However, there are clear alternative views from other groups, who do not support the status quo and would like to develop their businesses independently, but are constrained by the current regulatory arrangements.

- These groups include the Northern Rivers supply chain and some ricegrowers in the Riverina/Murray region.
- Northern Rivers stakeholders see potential for significant further growth in the region and consider current vesting arrangements to be a key constraint to growth. This is because it is uneconomic for them to export via SunRice's facilities in the Riverina.
- Several Riverina/Murray ricegrowers also wish to leave the vesting arrangements as they believe that they could get higher paddy prices by developing or moving to another supply chain and through branding and marketing their own product.

These ricegrowers consider that access to export markets would provide the scale and market diversification to justify infrastructure investments and attract investors.

Testing the benefits of rice vesting and the export single desk

The rationale for vesting and the operation of a single export desk is to increase industry profitability beyond that which would exist in a more competitive situation. This increase in profitability could result from:

- controlling supply and quantities sold to individual markets to increase the average prices which are then fed back to higher farm-gate returns
- improved coordination of industry functions, such as production of seed, and the use of economies of scale to minimise industry costs, and strategic investment in R&D, marketing and branding.

While the current vesting and single-desk arrangements can support these functions, other agricultural supply chains achieve the same benefits through other means.

This analysis goes deeper than previous reviews

In the case of previous reviews of rice vesting and other examples of single desk arrangements, such as those for barley, the benefits focused on export premiums — measured by the premiums between the price received and the prices of competitors products in the same market.

The RMB analysis of export premiums and approaches by NSW DPI and the Commonwealth Productivity Commission implicitly largely attribute observed differences between the average export prices received for NSW and competitors' products to the operation of the single desk. These calculations recognise some, but not all, of the contributing factors to an observed export price that includes the cost of production, quality, packaging, proprietary and country branding and service elements.

The real question is: how would export prices change without the current arrangements? This question focuses on what the structure of the industry post-deregulation would look like and what type of product would be produced and sold.

Evaluating export price premiums: approaches and conclusions

Several approaches, including testing of demand elasticities, export price comparisons and observations of market behaviour have been applied. No method produced evidence that price premiums exist that are attributable to the exercise of market power by the SEEL holder.

This finding is consistent with the proposition that the NSW rice industry is positioned as a niche player in the global market, based on product differentiation, branding and marketing. It is subject to a range of market forces, especially when competing with cheaper product, and where possible avoiding direct competition with a range of competitors such as the Californian and Egyptian industries.

Rather than using price discrimination to increase average returns across all markets, the existing supply chain behaves like other food multinationals — using branding and market positioning to target premium markets and using multi-sourcing strategies to provide consistent product year-round to consumers in targeted markets and segments.

Evaluating freight-scale advantage (FSA)

Using the scale of its total freight task, across both Australian rice and product sourced from other countries, SunRice can reduce the average cost of freight on exports compared to the case where only Australian rice was exported. Lower freight rates improve average export returns for NSW price.

- Due to the commercially-sensitive nature of the benefits, it was not possible to independently verify them.
- Therefore, the estimates of FSA from the holder of the SEEL, and reported by the RMB, have been used in this evaluation.

The approach taken asked how these benefits would change under each of the scenarios through two mechanisms:

- lower export volumes by the SEEL holder as the result of diversion of product from export markets to the other supply chains; and
- lower per tonne benefits (that is, higher freight prices) that result from the lower volume.

The analysis showed that while there was some loss in these benefits, they were relatively small as the majority of the benefits identified were attributable to markets that *were not* targeted by the other supply chains.

It was concluded that these benefits are more attributable to being a large food multinational rather than from holding the SEEL.

In the absence of rice vesting, would a viable rice export market continue to provide benefits for NSW rice growers?

A key finding of this report is that in absence of rice vesting and the export single desk, a range of opportunities would remain available across export markets that build on product differentiation and proprietary and Australian branding.

Particularly, these opportunities include markets that are considered as premium in global trade — such as the Middle East — but also emerging opportunities particularly from improvements in access to markets in Japan and the United Kingdom.

Scenarios to be quantified

The 3 scenarios that were evaluated are summarised in table 1 and were developed based on the feedback from completed industry consultation which provided a deeper understanding of the key issues.

1 Summary of scenarios^a

	Remove export single desk	Complete domestic deregulation	Description/Comments
Retain the single-desk arrangement in its entirety			
Scenario 1a	X	X	▪ Baseline
Scenario 1b	X	✓	▪ Baseline with increased domestic competition (reform of buyer licencing and rice vesting powers)
Removal of NSW rice-vesting and single-desk export arrangements			
Scenario 2	✓	✓	▪ Complete removal of current arrangements
Single desk geographically confined to the Riverina/Murray region with an increase in domestic competition			
Scenario 3	Partial	✓	<ul style="list-style-type: none"> ▪ Export single desk maintained for Riverina/Murray region ▪ Increased domestic competition (reform of buyer licencing and rice vesting powers)

Source: CIE.

The consultation revealed that in addition to the export single desk, and the exclusion of the Northern Rivers region from the export-single desk arrangements, that reforms to domestic regulation would improve competition in the domestic market. Key messages included:

- these reforms would address restrictions on domestic licencing and storage, outside of licenced domestic buyers, and reporting requirements to the RMB
- the restrictions also inextricably linked to the export single desk — as ease of entry to the domestic market as well as the opportunities in export markets are both necessary for the development of a larger and more-competitive rice industry.
- incorporation of the domestic market is integral to any analysis of the export single desk and export markets.

Analysis of scenarios using an economic model

An economic model was specifically developed to demonstrate the potential impact of scenarios that would result in greater opportunities for the NSW rice industry.

The NSW rice industry is represented by the existing supply chain but also:

- the Northern Rivers supply chain
- a group of growers in the Riverina/Murray who wish to leave the Grower's pool.

For each of these supply chains, the economic outcomes without regulatory change (the baseline) are compared to those that would plausibly happen for each of the scenarios above (the counterfactual). The economic model can be summarised by table 2 which identifies that 3 NSW supply chains compete in 5 market groups. In addition, the economic model includes product from the California industry that also supplies into each of these markets.

2 Markets targeted by supply chains in scenario 2

Market	Existing Southern NSW supply chain		Northern Rivers
	Grower's pool	Breakaway group	
Domestic market	✓	✓	✓
New Zealand	✓	✓	✓
Middle East	✓	✓	✓
Japan	✓	✓	✓
Other export markets	✓	X	X

Source: CIE.

This model focuses on the central question of how export (and domestic) prices of NSW milled rice would change with additional competition in key markets. It therefore estimates changes in the value of sales by markets and market grouping.

It does not estimate, however, how changes in the sale value of milled rice would be transmitted along each supply chain — in terms of the paddy price. This would require knowledge of detailed costs and credits from coproducts — which was not available from the respective supply chains.

These opportunities across markets for the existing and new supply chains depend on several factors:

- the quantity of new product that is exported by market or market grouping — relative to existing supply of NSW rice but also medium-grain suppliers (including US product)
- the placement of this product in terms of branding and other attributes — and how consumers respond in terms of volumes and prices paid relative to the existing profile in the market
- how these existing players respond to the increased competition.

The main drivers of potential economic benefits for those supply chains that can access either the domestic market or both the domestic and export market include:

- the potential for increased production volumes and sales of the supply chain
 - In the Northern Rivers, this is largely a function of the increase in the number of growers that could be attracted to grow rice on a regular basis.
 - In the Riverina/Murray region, this would also involve increasing the number of growers who leave the Growers' pool but also their ability to grow and sell a higher value varietal mix.
- the variety, product type and price points — an implicit assumption is that new supply chain will not compete with the existing supply chain in their market space.
 - Rather, growing different varieties and branding based on production methods would differentiate themselves from the existing supply chain and other competitors in the market — such as US product.

A key rationale for the export single desk is the use of economies of scale — particularly in minimisation of milling and freight costs and the maximisation of the value of credits for coproducts.

- It was not possible for this evaluation to independently verify or compare detailed supply chain costs across businesses, or to justify their respective business cases.
- A key assumption is that strategies for costs, such as freight, and coproduct revenues have been factored into their milling and paddy prices.

Cost-benefit outcomes

Table 3 summarises the impact of scenarios evaluated using changes in:

- the value of sales for domestic and export markets — reflecting changes in volumes demanded and equivalent prices received at Australian wholesale or export fob level
- freight-scale advantage (FSA) — which, as estimated, is equivalent to a change in export price by market.¹

¹ Export fob prices excludes the cost of international freight, with the seller paying for freight to most markets, apart from Japan and Korea. Therefore, changes in FSA should impact average export returns received by market; the equivalent of an increase in the export fob price.

Note combined scenarios for both the Northern Rivers and the Riverina/Murray breakaway group will not equal the sum of the components due to substitution effects in the shared markets.

3 Headline impact on value of sales and FSA – moderate substitution^a

Change in sales for domestic and export markets				
	Existing supply chains	Expansion of existing and new supply chain	Reduction in FSA	Total
	\$m	\$m	\$m	\$m
Scenario 1b				
Northern Rivers only	-2.4	14.3	0.0	11.9
Riverina/Murray only	-27.1	57.6	0.0	30.5
Both regions combined^b	-29.6	71.9	0.0	42.4
Scenario 2				
Northern Rivers only	-4.2	37.4	0.0	33.1
Riverina/Murray only	-57.1	119.4	-1.3	61.0
Both regions combined^b	-56.1	137.6	-1.3	80.2
Scenario 3				
Northern Rivers only	-6.6	51.7	0.0	33.1
Riverina/Murray only	-27.1	57.6	-0.5	30.0
Both regions combined^b	-31.3	95.0	-0.5	63.1

^a Net present value of domestic and export sales and FSA over the period 2020-21 to 2026-27 using a discount rate of 7 per cent. ^b Result for combined regions may not be the sum of each region due to cross-price effects through markets. That is, Northern Rivers only shows the interaction with the existing supply chain that includes the Breakaway group. The combined results are the outcome between all three groups after price adjustments by market.

Source: CIE.

Key takeaways from the quantitative analysis

The scenarios developed for this evaluation are based on information obtained from industry during the consultation phase.

- Under all reform scenarios examined reforms are expected to deliver benefits in terms of value of sales at a NSW level. While there is some uncertainty in how markets would develop, we do have confidence that benefits outweigh the costs in terms of the value of sales.
- There is consistent evidence that there are significant opportunities for industry development and innovation, particularly at the small to medium business sizes, that are currently being constrained under the current regulatory framework.
- A key conclusion of the analysis is that rather than a deregulated industry devolving into a large number of competitive businesses, the existing supply chain is likely to largely continue as is due to its size and market positioning.

- While the existing supply chain is a niche player in the world market, new entrants will also rely on branding and differentiated products that will be targeted at specific market segments. The objective of the new entrants is to minimise competition with other Australian producers of rice.
- Larger benefits can be achieved where there is reform of domestic regulation as well as the export single desk. These benefits come about by:
 - The limited size and capacity to pay of the domestic market — especially in a market that is already dominated by larger players.
 - Allowing supply chains to diversify their market base provides the confidence to attract more growers and throughput over the medium to long term.

The key drivers of the results recognise that:

- the potential Northern Rivers production area is currently modest compared to the scale of the industry in the Riverina/Murray region, however, there is significant potential to increase farm incomes and increase enterprises options
- businesses in the Riverina/Murray who choose to leave the Grower's pool will do so because they believe they can receive higher returns from improved branding and marketing of their own product
- for the existing supply chains in the Riverina/Murray region, the loss of throughput and pool sales will reduce revenue across all markets in the first instance and then in relation to the additional competition faced in each of the export markets identified.
 - This loss of throughput is assumed to also impact on any freight-scale advantage in the existing chain.

It is noted that the impacts on the existing supply chain in each case are modest — compared to the market variation that has been observed in both the ricegrowing sector and in each of the markets. In fact, in response to this variation, this supply chain has already adapted its marketing strategy and diversified its corporate base.

In each scenario, there are net benefits relative to the base case where rice vesting and the export single desk is retained —which are maximised in scenario 2 with access to both domestic and export markets. The present value of improvements to domestic and export sales over 6 years to 2026-27 amounts to \$80.1 million or a 3.9 per cent improvement in domestic and export sales to the NSW rice sector.

Longer-term benefits are expected to be much larger

The benefits identified are limited by the 6-year timeframe of this evaluation represent a transitional period to a new operating environment.

- Given that 2026-27 is a representation of outcomes that could be reasonably expected in a 'normal year' with the maximum impact of the existing and new supply chains, the results in present value terms in table 3 significantly underestimate the net benefits of each scenario if a longer timeframe were considered.
- In each year following 2026-27, the annual benefits would be expected to vary around the 2026-27 results in line with changes in production in both NSW regions and with global trading conditions and prices.

Impacts on NSW Regions

In terms of the region impacts of the scenarios evaluated, the impacts are compared against an industry baseline of variability in paddy production especially in the southern region, and ongoing changes in employment in the milling sector that is the result of paddy availability and from corporate decision-making to manage supply chain costs.

The key points can be summarised as follows:

- as all farms are multi-enterprise, there would be no reduction in businesses beyond those that would occur anyway through farm consolidation
 - There would be increase in the opportunity for higher farm incomes especially in the Northern Rivers region especially where rice would be substituted for lower gross margin enterprises such as soybeans and uncropped land currently used for grazing.
 - For the new Riverina/Murray group, benefits would include in the increase in farm revenue and gross margins that result from higher value varieties, compared to those required by the existing supply chain, and having more control over decision-making.
- there will not be farm jobs lost for any of the regional groups — with very small if any increase in on-farm employment, but an increase in labour productivity
- small increases in employment in the drying, storing and milling sector in both regions — which could include the transfer of employment from one supply chain to another.

Key findings

Table 4 summarises the key findings and conclusions against the questions posed in the terms of reference for the DPI Review.

4 Key findings of the evaluation

Question	Conclusion
Do the benefits of rice vesting outweigh the costs to the community as a whole?	<ul style="list-style-type: none"> ■ No. A key finding of this report was that the current export single desk does not result in export prices above those that could be reasonably expected in the case without a single desk. ■ The current regulatory framework restricts the ability for new supply chains to compete effectively in potential markets. This is especially the case where exports provide the option for these new players to diversify their sales and manage market risks. ■ In absence of these restrictions, the most likely outcome would be that the existing supply chain continues to operate as business-as-usual albeit at lower throughput levels while new supply chains emerge to take advantage of new domestic and export opportunities. ■ The benefits to individual businesses are likely to be substantial and the flow-on benefits to regional NSW are clearly positive compared to those for export single desk — especially for regions that cannot currently export and are restricted to the domestic market.

Question	Conclusion
Are any net benefits (or the majority of these benefits) derived as a result of rice vesting alone?	<ul style="list-style-type: none"> ▪ The objective of rice vesting by the RMB is to enable the operation of the export single desk and the generation of export premiums relative to the case of a competitive market. ▪ A finding of this report is that observed export price premiums are not the result of market power but from a differentiated product approach that is based on a branding strategy, targeting niche markets, and providing year-round product to customers. ▪ The SEEL holder is a small player by global standards and operates in niche market in an increasingly sophisticated global market. ▪ In a deregulated market, there is little chance that the NSW rice industry would resort to a larger number of independent supply chains or a Californian-style industry where there are 3 large corporate players.
In the absence of rice vesting, would a viable rice export market continue to provide benefits for NSW rice growers?	<ul style="list-style-type: none"> ▪ Yes. Without vesting and a single export desk, new supply chains in the market would be able to develop new markets and products with minimal impact on established supply chains.

Source: CIE.

Other issues for consideration

The stakeholder consultation identified several key issues that were inextricably linked to rice vesting and the export single desk. These were primarily around the provision of industry good functions that include:

- breeding, production and distribution of certified rice seed
- the coordination and delivery of extension — the provision of information that enables adoption of best practice and R&D outputs that enables farmers to maintain and improve productivity
- the collection and publishing of industry statistics.

Addressing these issues would increase the net benefits beyond those identified in table 2, making possible a transition to new industry structures that provide growers and their supply chains more operational flexibility — not only in how they sell their product but also how they produce it.

1 Introduction

The NSW Productivity Commission commissioned the Centre for International Economics (CIE) to undertake an evaluation of the costs and benefits of the single-desk export arrangement for rice grown in New South Wales. This evaluation will be an input to the 2021 NSW Government review of rice vesting (the Review) undertaken by the NSW Department of Primary Industries (DPI).

Background for this evaluation

Under the *Rice Marketing Act 1983* (NSW) (the Act), all rice produced for export in New South Wales is the legal property of the NSW Rice Marketing Board (RMB). The Board issues one sole and exclusive export licence (SEEL) and licenses buyers who can acquire rice and market it on the domestic market.

- The export licence was initially granted to SunRice in 2006 and renewed in 2011, 2015 and 2016. It is due to expire on 30 June 2022.
- The Board is Australia's only remaining statutory single-desk marketing board.

Price premiums are often used as evidence of the benefit from maintaining single-desk export arrangements. There have been numerous reviews of the single-desk export arrangements for the New South Wales rice industry.

- In 2016, The Commonwealth Productivity Commission² found that premiums were limited to the New Zealand market, where Australia has a significant advantage on transport costs, and concluded that the claims of price premiums were overstated.
- Shortly after, a NSW DPI³ review found that price premiums exist, and that the removal of vesting posed a risk to the ongoing ability to extract price premiums for NSW rice exports.

In 2016, the NSW Department of Primary Industries (DPI) recommended a review of rice vesting arrangements in 2020, two years before the current single-desk arrangements expire.

In the NSW Productivity Commission White Paper⁴ their key recommendation for the current rice marketing arrangements was:

Complete the 2021 Review of Rice Vesting Proclamation. Allow the rice vesting export arrangement to expire unless it is shown to deliver a net public benefit.

² Productivity Commission 2016, *Regulation of Australian Agriculture*, Report No. 79, November.

³ NSW Department of Primary Industries 2016, *Review of Rice Vesting Proclamation*, December.

⁴ NSW Productivity Commission 2021, *Productivity Commission White Paper, Rebooting the Economy*, May.

This evaluation is important because the NSW Government is required to ensure that that current rice marketing regulation continues to deliver a net public benefit to the state and to regional New South Wales.

This evaluation will be an input to the 2021 NSW Government Review of Rice Vesting Proclamation (the Review) that is undertaken by the NSW DPI.

CIE has been asked to examine three related questions which align to the DPI Review's terms of reference:

- do the benefits of rice vesting outweigh the costs to the community as a whole?
- are any net benefits (or the majority of these benefits) derived as a result of rice vesting alone?
- in the absence of rice vesting, would a viable rice export market continue to provide benefits for NSW rice growers?

Outline of approach

The approach taken in this evaluation builds on the previous analysis of the benefits and costs of export single desks, both in the rice industry but also other agricultural commodities and has been informed by an extensive stakeholder consultation program — in close collaboration with the NSW DPI.

- Chapter 2 provides the context for the evaluation, including the location and significance of the rice industry to NSW regions and the key drivers of how this contribution may change. The chapter also provides:
 - specifics on the regulatory arrangements that are enabled under the Act — across both rice vesting by the RMB and the awarding of the export single desk.
 - an overview of export markets for NSW rice in terms of performance across markets and relative to its direct competitors
 - key trends in international markets for rice that need to be considered as part of the options that will be developed for the cost-benefit analysis.
- Chapter 3 provides a detailed report on the scope and the key messages and outcomes from the consultation process that was undertaken in-parallel with the DPI Review that had its own extensive consultation process, including public submissions.
- Chapter 4 develops the methodology used to quantify the benefits and costs by reviewing previous analysis of export single desks, including those for rice, and the estimates of benefits from the export single desk prepared by the rice industry.
 - Based on available information from industry consultation, an approach was developed that included the analysis of market power (from the single desk) and the development of an economic model that would inform the cost benefit analysis.
 - This chapter also involved the development of plausible scenarios for the options to be quantified.
- Finally, chapter 5 provides the outcomes of the quantitative analysis against the options to be evaluated.

2 *The rice industry and its importance to NSW*

The NSW rice industry is located across separate regions of the state that are important contributors to the total economy of regional NSW.

The Riverina/Murray region is located in southern NSW across three irrigation areas: Murrumbidgee, Coleambally irrigation areas and the Murray Valley irrigation district. For the 2021 crop year, it is estimated that 98.8 per cent of rice grown in New South Wales is grown in this region.

- This region is spread across several districts that include Narrandera in the east through Tocumwal-Finley-Jerilderie, Griffith, Leeton and to the Hay region in the west and the Deniliquin district in the south. ⁵
- Nearly all of these farms access water from storages on the Murray and Murrumbidgee Rivers and delivered to farms by each of the rivers, as well as by a network of canals and ditches that is accessed by all irrigated enterprises across grains, pastures, vegetables and permanent plantings of fruits and nuts.

The Northern Rivers industry is in the hinterland of northern coastal NSW and includes the following districts: Casino, Kyogle, Ballina and Lismore. ⁶

- Rice is grown on in-season summer rainfall, rather than with irrigation. Typically, annual average rainfall falls as you move away from the coast. The region is subject to very wet summers that make cultivating a range of crops challenging due to waterlogging.
- Cropping options include corn, soybeans, and sugar cane. Land that is not cropped is dominated by cattle grazing.
- Australian rice varieties bred for the Riverina/Murray regions are not well suited to upland rice ⁷ cultivation in the Northern Rivers as they have been bred for drought and cold tolerance as opposed to varieties that tolerate prolonged waterlogging.

⁵ These districts also cover the rice quarantine area where rice plants, seeds and by-products can be brought in from outside the zone. Note that Riverina region includes a number of areas where rice cannot be grown in the east such as West Wyalong, Temora, Junee, Gundagai and Tumbarumba-Tumut.

⁶ Also note that Northern Rivers also includes the Dorrigo, Grafton and coastal districts where rice is not currently grown.

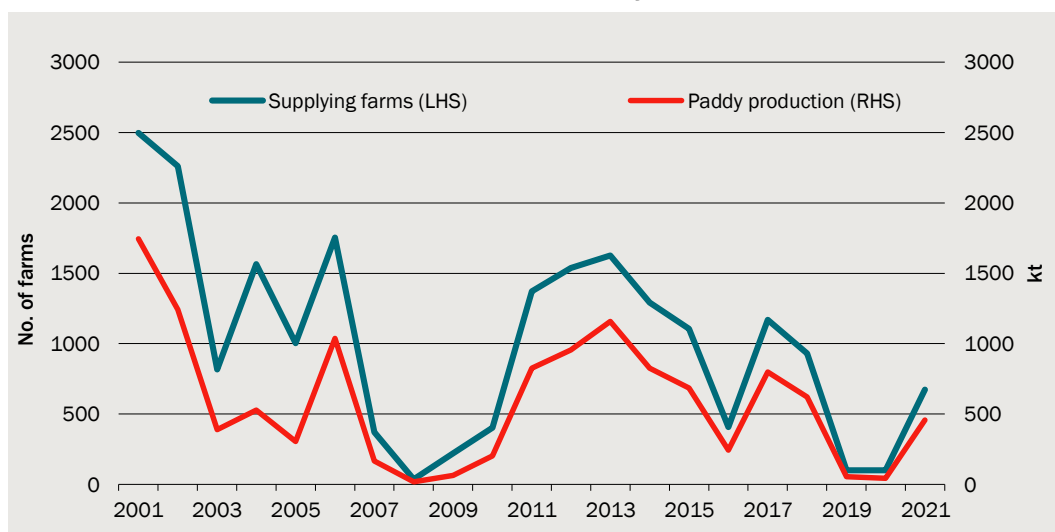
⁷ Upland rice is grown in fields that are cultivated and seeded when dry as the case as other broadacre grains and are not suited to coastal or sub-tropical areas

Riverina/Murray industry

Large variability in rice production systems

There are two key characteristics of the Riverina/Murray rice industry demonstrated by chart 2.1:

2.1 Production trends in the Riverina rice industry^a



^a Not that the estimates for 2021 are sourced from SunRice reported by Grain Central.

Data source: RMB and <https://www.graincentral.com/news/riverina-rice-harvest-heralds-industry-revival/>

- highly variable production — a function of the availability of water for irrigation — on the basis of allocation of system yields
- this variation is highly correlated with the number of active growers supplying rice — when system allocations fall, rice growers choose to switch to other enterprises or trade their allocation within or outside of the region.

At the peak of production in 2001, there were around 2 500 supplying farms — which has steadily declined as water allocations fell and with increased competition for both land and water.

For the 2021 and 2022 crops, ABARES estimates that paddy production will be 458 and 660 kt reflecting the increase in water allocations from the Murrumbidgee and Murray systems.⁸

While the number of farms supplying rice has fallen, the average production per farm of those remaining suppliers has been (comparatively) steady since the period of reduced low yields in 2003-04, 2007-08 and 2019-20 that resulted from unreliable water delivery and high temperatures (see chart 2.2).

⁸ ABARES 2021, *Australian Commodities: September quarter 2021*, vol. 6 no.3, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, accessed 13 October 2021.

It is noted that there is not a one-to-one correspondence between farms and growers. With greater aggregation of properties, the number of growers is becoming less than the number of farms. For the 2021 crop year there were 475 growers across 674 farms.⁹

In fact, the falling number of growers and trend in paddy supply, along with zero water allocations, culminated in the 2020 crop year when there were around 102 growers supplying just 44.8 kt of paddy.

2.2 Average rice production per farm in the Riverina



Data source: RMB. and <https://www.graincentral.com/news/riverina-rice-harvest-heralds-industry-revival/>

Competition for land and water has shaped rice production

The Murray-Darling Basin Plan of 2012 has been crucial in reshaping irrigated agriculture in the region. These reforms primarily included:

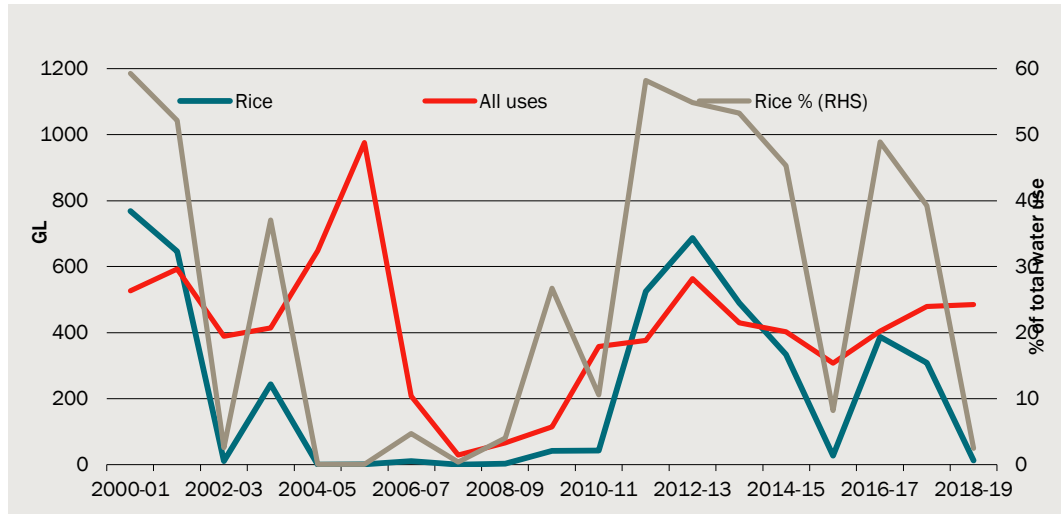
- the introduction of sustainable diversion limits (SDLs) and the so-called ‘buy backs’ of water for environmental flows which are factored into the SDLs
- the separation of water from land (specific water allocations were previously assigned to farms or parcels of land and could not be traded unless the land was sold); and related
- the establishment of water trading rules that enabled water to be sold or bought — within and outside of an irrigation valley or region.

To demonstrate the volatility of SDLs and allocations, chart 2.3 shows water use in the Murray Irrigation Area (MIA) which has contributed around one-third of total Riverina rice production over the past 10 years.

- Over the past 20 years, there have been 7 years in which allocations were less than 40 per cent allocation and 4 years where there was no allocation.

⁹ <https://www.graincentral.com/news/riverina-rice-harvest-heralds-industry-revival/>

2.3 Water use in the Murray Irrigation area

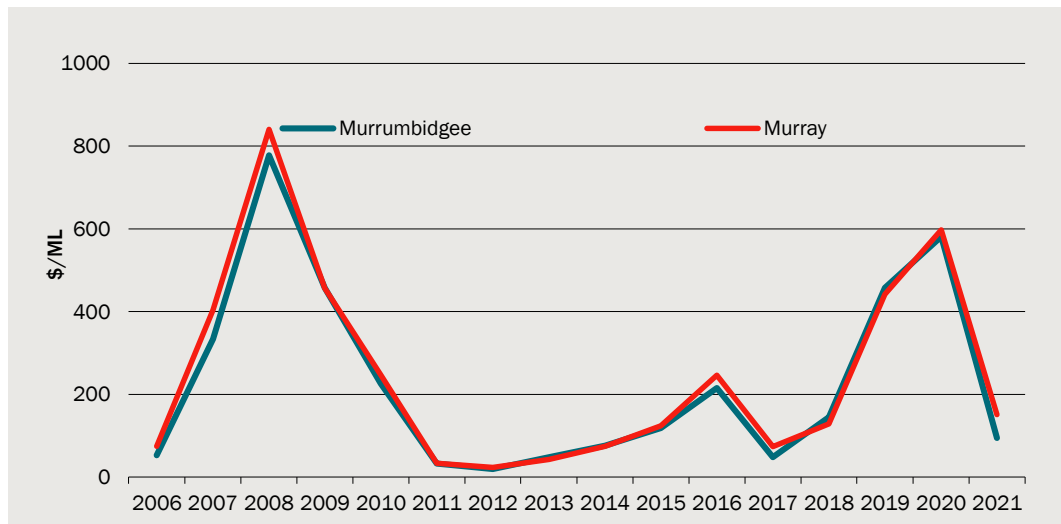


Data source: Murray Irrigation.

- Water use by rice varied between 60 per cent of total MIA usage in 2000-01, to 39 per cent in the last 'normal' irrigation year in 2017-18 and down to zero in no-allocation years.

Chart 2.4 shows that the traded water price — dominated by temporary trades — is also volatile in the Riverina/Murray regions. Temporary prices peaked during the 2007-08 and the 2019-20 periods where there were zero allocations. Increased pressure for both land and water has impacted not only on rice but also all lower-value irrigated activities including dairying and pasture/forage production. Particularly evident is the increase in plantings of permanent horticulture such as almonds (see chart 2.5) and walnuts.

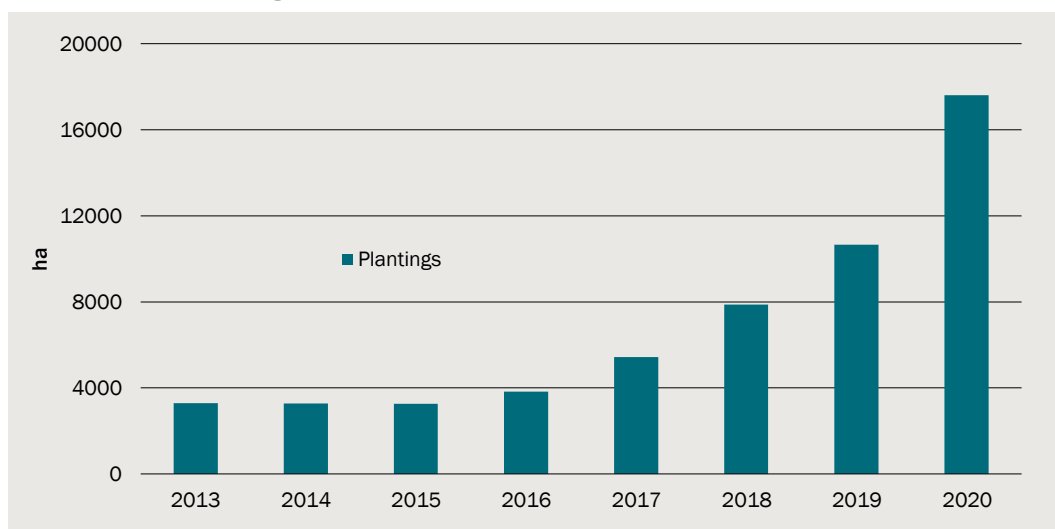
2.4 Average value of water trades in the Riverina^a



^a Murray is the average of Murray Above and Below.

Data source: ABARES Water Market Outlook – August 2021.

2.5 Almond plantings in the Riverina



Data source: Almond Board of Australia.

Permanent plantings by corporate players have been recognised by SunRice as a threat to rice throughput especially when water availability falls.¹⁰

Permanent crop (high security) water entitlements had long been restricted to less than 20 per cent of valley licences to preserve a diverse base of water-dependent farming industries rather than putting vast plantings of citrus, nuts or grapes at risk when droughts or low flow conditions set in.

Varieties and rice products

Paddy production is not a homogeneous activity and is differentiated by rice varieties and production method.

The core of rice production in the Riverina is medium-grain rice — typically between 70 and 80 per cent of total land will be planted with the variety Reiziq — which was initially developed for the premium Middle East market. For example, in 2019, 73 per cent of the rice area planted was to Reiziq — the major product line for the current supply chain.¹¹

Other Japonica varieties also include premium varieties such as:

- Doongara — a low GI medium-grain rice for the domestic and export markets
- Koshihikari — which is aimed at the premium short-grain sushi market.¹²

Rice can also be grown conventionally, using direct drill and broadcast seeding, or grown in organic/bio-dynamic systems.

¹⁰ <https://www.farmonline.com.au/story/6201206/sunrice-boss-says-orchards-eroding-irrigation-sustainability/>

¹¹ https://investors.sunrice.com.au/FormBuilder/_Resource/_module/2weQNICYSUy13FE_jxQXvg/file/Media_Releases/190613_SunRice%20Media%20Release_C19%20Harvest_Harvest_FINAL.pdf

¹² Some growers identified that Koshihikari could be difficult to grow in some localities which contributed to its status as a premium variety.

Northern Rivers

There are stark contrasts between the rice production systems in the Riverina and the Northern Rivers systems. This is a summer rainfall region compared to the Riverina where rainfall is typically in winter and spring, and where summer crops such as rice utilise residual soil moisture from winter crops and are heavily supplemented with irrigation from before Christmas onwards. The crop profile includes:

- sugar cane (which is on the decline)
- soybeans and corn
- barley, oats and some chickpeas.¹³

As this is an emerging enterprise in the region, recent statistics have not been published by the RMB. The estimates for this report, based on information obtained during industry consultation, put production for the 2020 crop year at around 5.6 kt of paddy grown on around 20 farms — where planted areas range up to 300 hectares per farm.

Relative to the Riverina/Murray region, production is small-scale — but has grown significantly from a small base. Previous reports have identified that the potential for rice in the region, primarily as an alternative for soybeans or corn, ranged from about 25 000 to 70 000 hectares. Given sufficiently high paddy returns, this potential could be around 50 000 hectares.¹⁴

Typically, production in this region would represent less than 1 per cent of total NSW rice production. However, for the 2020 crop year, when southern paddy production fell to 45kt, it is estimated that Northern Rivers represented around 12 per cent of the NSW total. Chart 2.6 shows the timeseries of paddy production and number of growers that was developed for this evaluation.

As rice in this region is a rainfed crop, it is also subject to large variability in yields — from 3.5 to over 7 tonnes per hectare. In some years, high rainfall results in a lower planting as machinery cannot get onto some paddocks.

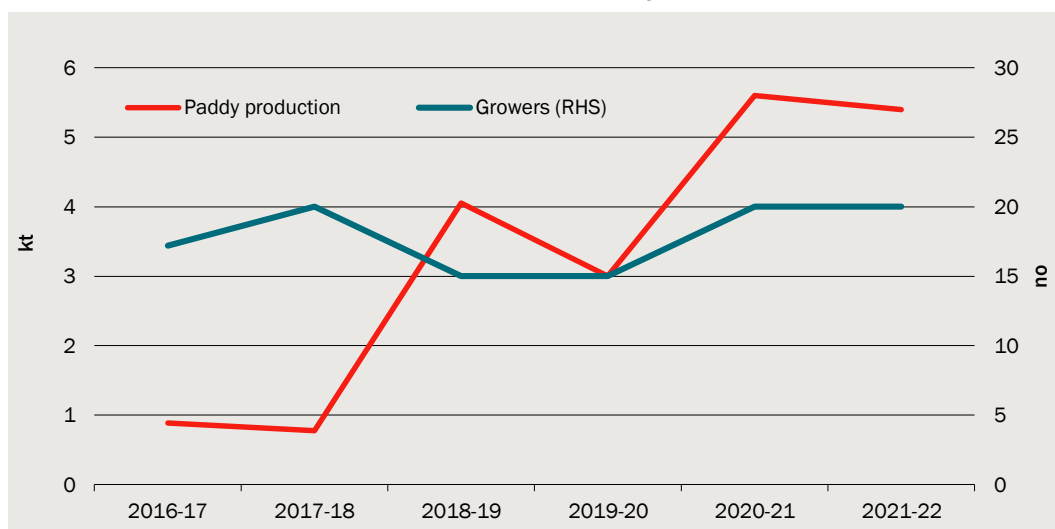
Northern Rivers ricegrowers plant a number of medium-grained varieties, including Sherpa, and long-grain varieties such as Langi and Doongara.¹⁵ This seed is sourced from the southern industry. Another medium-grain variety used is Tachiminori because it is suited to the agronomic conditions in the northern industry. This variety is not required to be sourced from the southern industry. The region also produces coloured (black) and bio-dynamic rice.

¹³ Some farms are also mixed enterprises running cattle on the non-arable parts of their properties.

¹⁴ Aither 2018, *Expanding the New South Wales rice industry: Independent review of the viability of developing the rice industry outside the Murray and Riverina regions*, Prepared for the Rice Marketing Board. May.

¹⁵ Op. cit.

2.6 Rice production in the Northern Rivers industry



Data source: ABS, RMB and CIE estimates.

Current regulatory arrangements

The current regulatory environment for NSW rice production involves a number of components:

- the *Rice Marketing Act 1983* (the Act) directs that all rice produced in NSW be vested in the NSW Rice Marketing Board (RMB). That is, once paddy has been harvested, it becomes the property of the board and must be shipped to a licenced domestic buyer within 24 hours.
 - Vesting is based on the proposition that providing a single statutory authority, with the legal right to control the marketing of rice will result in net benefits to the rice industry and the wider community and state.
- to maximise these benefits, the RMB then grants the licence for Sole and Exclusive Licence (SEEL) for selling NSW rice to export markets.
 - The SEEL also obliges the licence holder to purchase all rice produced in New South Wales that is offered to it by producers and, subject to certain qualifications, to operate an equitable crop marketing and payment scheme.
 - This obligation to act as the ‘buyer of last resort’ is consistent with the licence holder as the major purchaser of NSW rice.
- the Act outlines the objectives of the RMB to include encouraging the development of a competitive domestic market for rice.
 - All NSW rice must be sold and delivered to an Authorised Buyer(s) within 24 hours. Unless a grower is also an Authorised Buyer, they cannot retain any of the rice they grow.
 - The RMB licences businesses as authorised domestic buyers. This licencing involves an application and reporting process to the RMB.

Regulation of the NSW supply chains by the RMB

It is the view of many stakeholders that the domestic market is deregulated. Indeed, ABARES ¹⁶ says that:

Domestic marketing of rice was deregulated in 2006. Since then, domestically grown and processed rice now competes openly with imported rice.

But, in reality the domestic market is heavily controlled. When imports were liberalised in 2006, important powers remained with RMB in terms of their vesting and their control over domestic production.

During the financial year the NSW Government has announced it has legislated that from 1 July 2006, the Rice Marketing Board must allow other entities to be registered as ‘authorised buyers’ of rice in NSW. Whilst Ricegrowers Limited will compete with these entities in the domestic market it will, with the written approval of the RMB, retain its single export desk status. ¹⁷

As identified in the Act above, these key powers revolve around the ownership of paddy by RMB once harvested and the authorisation of domestic buyers who can store, mill and sell rice on the domestic market. There are currently 12 licensed buyers as shown in table 2.7.

2.7 Licenced buyers of NSW rice

	Segment	Use of licence
Sun Rice	Riverina	Holder of the SEEL and domestic marketer
GrainCorp Limited	Trader/Exporter	Inactive Buyer. Licence being held as option value
Slater Farms	Northern Rivers	Bio-dynamic grower, marketer under own brand and toll miller
Frank Boyle	Northern Rivers	Nimbin Valley Rice. Sells product locally through regional markets
Organic Grains	Riverina/Vic	
Carmac Trading	Northern Rivers	Ricegrower and marketer under own brand OzRice through speciality stores and local markets
Randell Organic	Riverina	Organic ricegrower and marketer under own brand.
Australian Food and Agriculture Company Limited	Riverina	
Natural Rice Co Pty Ltd	Penrith/Northern Rivers	Marketer of Northern Rivers rice.
Rodney and Wendy Heffer	Riverina	
Goulburn Enterprises (Australia) Pty Ltd	Trader/Exporter	Inactive. Licence being held as option value
Blue Fattoria Pty Ltd	Northern Rivers	

Source: RMB and industry consultation.

¹⁶ <https://www.agriculture.gov.au/abares/research-topics/agricultural-outlook/rice>

¹⁷ Sunrice Annual Report 2006 https://investors.sunrice.com.au/FormBuilder/_Resource/_module/2weQNICYSUy13FE_jxQXvg/file/annual-reports/Annual_Report_2006.pdf

These buyers cover two distinct groups:

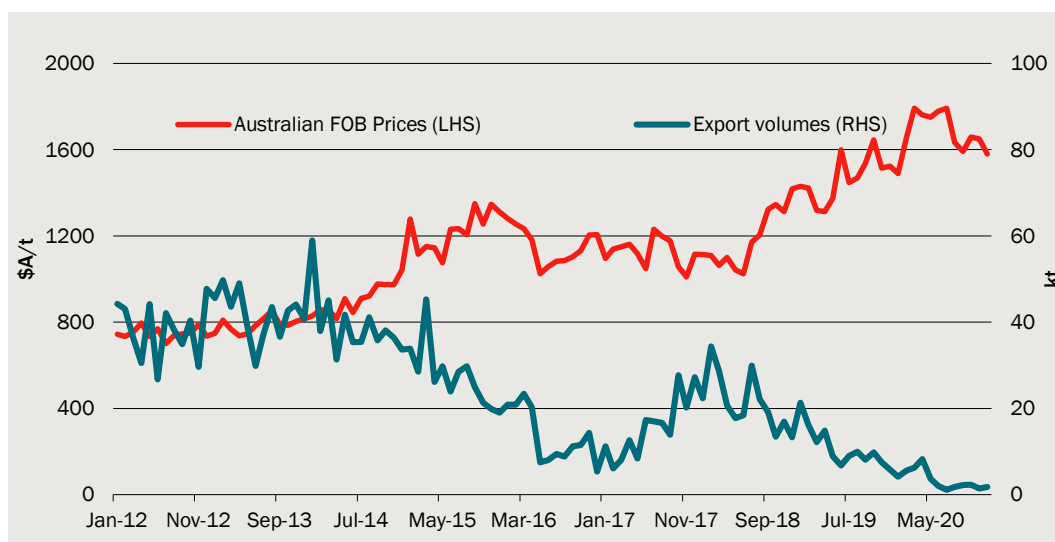
- millers and marketers of NSW rice. SunRice as the holder of the SEEL is the largest authorised domestic buyer
- ricegrowers who produce, mill, store and market rice their own rice. Some of this group store and market rice on behalf of other growers.

NSW rice exports

Downward pressure on rice production through increasing competition for water is directly reflected in volumes exported by the Riverina/Murray region over the past 10 years — as shown in chart 2.8. While there has been a distinct downward trend in exports, there has been a moderate recovery in the 2017-18 crop year in-line with the availability and the cost of irrigation. The sustained increase in average export returns for milled rice in chart 2.8 is attributable to a number of factors:

- increases in the cost of supply of rice, primarily at farm level, as a result of supply-side dynamics outlined above;
- an increase in world rice prices especially since 2017, as benchmarked by the average price of US short and medium-grained rice (chart 2.9) and favourable exchange rate movements.

2.8 NSW export volumes and fob returns^a



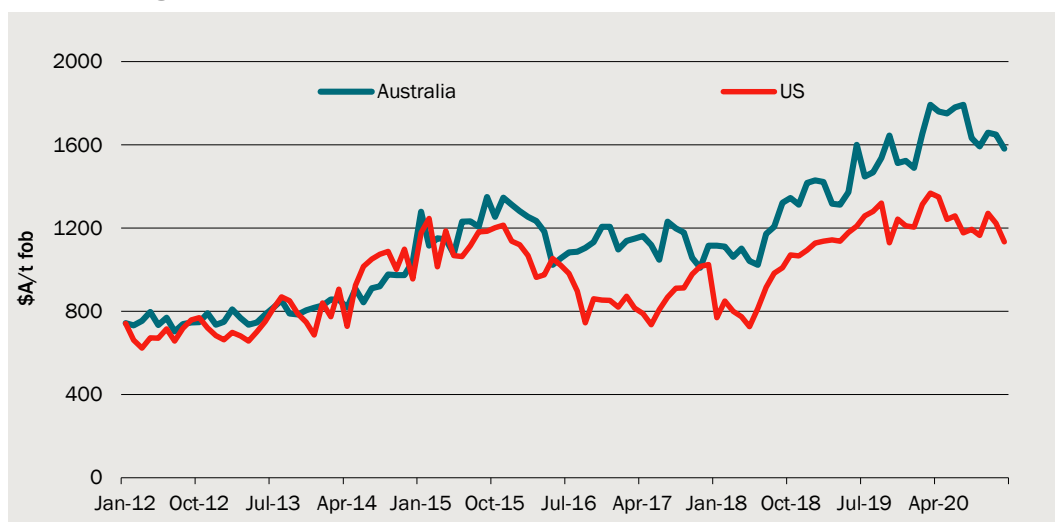
^a Short and medium-grain rice exported by Ricegrowers Limited.

Data source: ABF (Customs) data.

There are also several other contributing drivers to average export prices received that include (but not limited to) quality, branding and promotion.

In this report, historical exports of short and medium-grained rice by RiceGrowers Limited (SunRice) is referred to NSW-grown rice. It is noted that trade data records other exports of rice under other business names that are most likely based on imported product and have been excluded from the analysis.

2.9 Average fob export returns for NSW and US rice^a



^a Short and medium-grain rice.

Data source: ABF (Customs) data and USDA FAS trade data.

NSW milled rice exports also range across many dimensions:

- medium and short-grained rice (several different varieties are used)
- white (milled) and brown rice (husked)
- conventionally produced and organic
- a number of formats that include packets, bags and bulk (currently all shipped in 20-foot containers).

Performance by export market grouping

Charts 2.10 and 2.11 show annual export values and fob prices received by the NSW rice since the 2010-11 crop year.¹⁸ Over the past 12 years, NSW Rice has been exported to nearly 80 different export markets, but has focused on 20 core markets. Appendix A provides an overview of developments for the markets and market groupings.

2.10 Exports by market grouping^a

REDACTED

^a Short and medium-grain rice exported by Ricegrowers Limited.

Data source: ABF (Customs) data.

2.11 Average export returns by market grouping^a

REDACTED

^a Short and medium-grain rice exported by Ricegrowers Limited.

Data source: ABF (Customs) data.

¹⁸ The market groupings are on the same basis at the RMB Growers report that is prepared annually for the RMB on behalf of growers (details of specific countries can be found appendix B of this report. It is noted that these groupings do not include all exports of NSW grown rice.

Accounting for the normal variation across export markets, export volumes to each of the broad market groupings are highly correlated. However, there have been some important shifts over this period related to availability of NSW product and developments in individual markets.

Chart 2.11 shows that, for these market groupings, average returns are also correlated although there is a spread of prices that are attributable to a number of factors. For instance:

- export prices to WTO markets, including Japan, Korea and Taiwan, were bulk — which had to be competitively priced with bulk US product
- similarly, export prices to the Middle East grouping were also relatively low leading up to 2015-16 because of large volume sales of bulk rice to Jordan for packaging
 - Since 2015, the bulk sales to Jordan were phased-out and there was a greater focus on branded and packaged product in line with their marketing strategy — especially to Saudi Arabia.
- export returns to New Zealand have been consistently high throughout the period.

With a reduction in the availability of product, the composition of exports has moved to high-value packaged and bagged products.

Export strategies have adapted over time to move from a commodity trade basis to branded marketing approach to tap into the global demand growth for rice, and in particular, demand for premium rice. The traditional volume markets for NSW rice has been the Pacific Majors (Papua New Guinea and the Solomon Islands) and to a lesser extent to the Pacific Islands. Premium markets include the:

- Middle East region, particularly Saudi Arabia, Israel and Jordan
- New Zealand

There is a freight advantage for NSW exporters to each of these markets relative to US product.

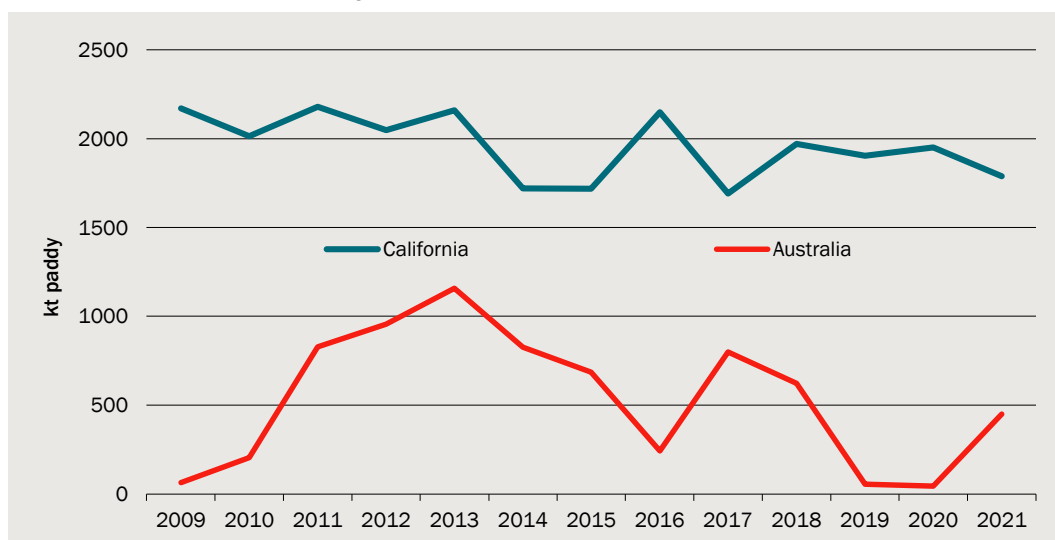
The WTO markets (Japan, Korea and Taiwan) are primarily commodity driven. This outcome is the result of government controls over the imports of rice which limit the distribution of import rice to lower-value uses such as for stockfeed and manufacturing. Rice can be imported through a series of tenders which are imported in-bulk and stored locally.

- NSW rice has been exported through these tenders when export returns, in Australian dollars, have been sufficiently high to warrant diversion of product from other markets. These opportunities largely depend on the availability and tender price of product supplied by Californian exporters.
- Recent changes in Japan access through the Comprehensive and Progressive Agreement for Trans-Pacific have opened the way for exports of premium short-grained without competing directly with Californian product.

NSW and US competition

The Californian rice industry is widely viewed as the direct competition for NSW rice in the majority of export markets — in terms of producing both short and medium-grained rice. The California industry, growing short and medium-grain rice is, on average, 3.5 time larger than the Riverina/Murray industry, but critically less variable (see chart 2.12). Over the 2009 to 2021 crop years, Riverina production was nearly 4 times more variable than the California industry.¹⁹

2.12 Australia and US paddy production



Data source: RMB and USDA.

Californian exports have two distinct segments:

- bulk exports to Japan, Korea and Taiwan to their Tender markets; and
- branded product into the premium markets such as those in the Middle East.

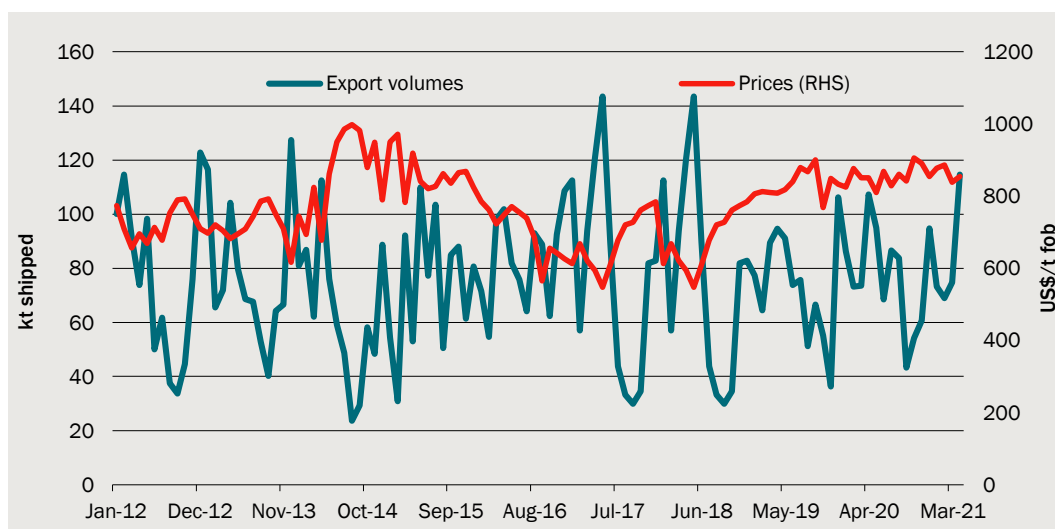
Charts 2.13 and 2.14 shows that the pattern of US appears more seasonable than for NSW rice exports — with major export months following harvest periods in the months of September and October and aligned with supply of large-volume tenders in-bulk to Asia, particularly Japan.

Over the period 2012 to 2020, US exports of short and medium grain rice were over 3 times that for SunRice on a volume basis. Even though it looks like United States exports are more variable than SunRice on a monthly basis, Australian export volumes are twice as variable as the US short and medium grain rice.²⁰

¹⁹ Using the coefficient of variation which is the standard deviation divided by the average/mean multiplied by 100 which enables comparison of different series. The variation for Australian export volumes was 65 per cent while for the United States was 35 per cent.

²⁰ Using the coefficient of variation. The variation for Australian export volumes was 65 per cent while for the United States was 35 per cent.

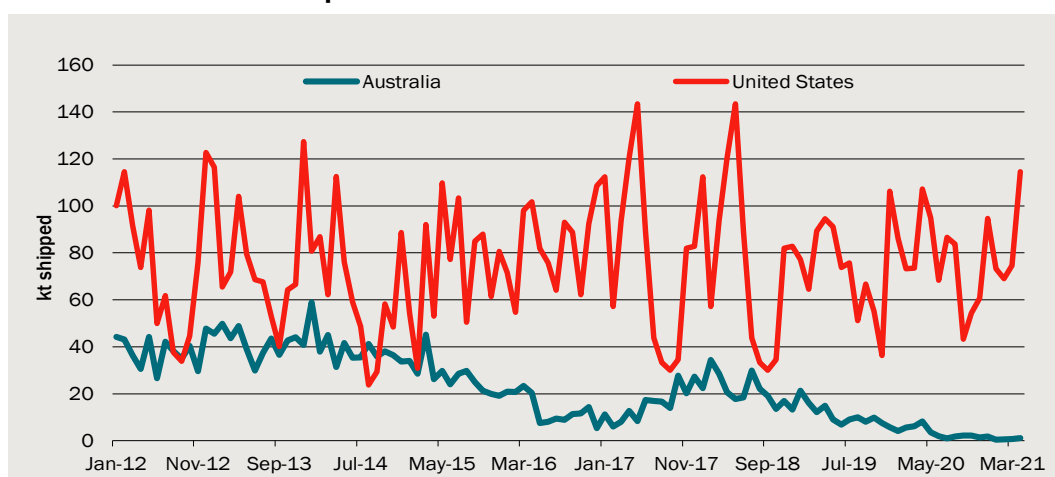
2.13 US exports volumes and fob returns



^a Short and medium-grain rice.

Data source: USDA FAS trade data.

2.14 Australia and US export volumes^a



^a Short and medium-grain rice.

Data source: ABF (Customs) data. And USDA.

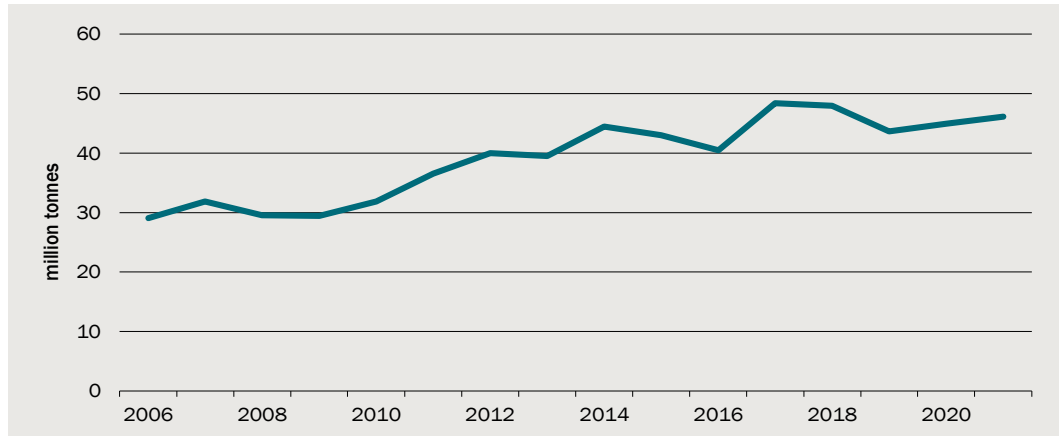
Global rice industry trends

The same as most other agricultural commodities, rice has experienced strong and steady demand across all import markets since the global financial crisis (chart 2.15) growing at an average annual rate of 3.6 per cent.

Since the global financial crisis, the world market for rice has moved from having a primarily commodity focus to one with a greater emphasis on quality, varieties and branding. The two broad categories of rice include:

- high-quality rices such as basmati, fragrant rices and medium and short-grain rice
- commodity long-grain rice.

2.15 Total world imports of rice^a

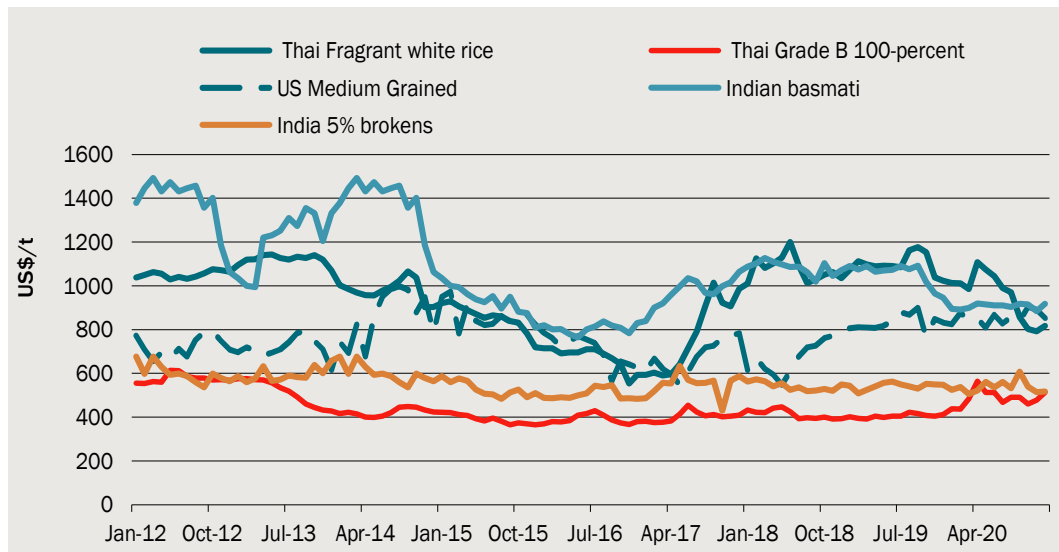


^a Milled equivalents

Data source: USDA.

Chart 2.16 shows world indicator prices are separated along quality lines where growth for international trade in rice with a range of attributes makes them desirable in countries with income growth and cuisines based around rice. Thai B grade and Indian 5 per cent broken are example of product at the commodity end of the spectrum.

2.16 World export prices^a



^a All on a FOB b basis. Indian Basmati rice is product export to Saudi Arabia comprising 70 per cent of that market.

Data source: USADA, APEDA.

Greater differentiation and branding are key trends

Increasingly, premium markets are demanding products that are more differentiated — that either have unique attributes in terms of taste or performance in specific uses in meal solutions or based on their production provenance — that is, the country or origin and production method that can include sustainable, bio-dynamic and organic accreditation.

In terms of greater differentiation, branding is also becoming more important. In fact, SunRice identifies its primary competitors in its communication with investors.²¹

In the global rice industry, Ebro, Mars (Uncle Bens) and Wilmar are some of the integrated rice players similar to SunRice with established presence in their respective regions and markets.

In the Australian retail grocery industry, market participants in rice and rice-based foods include SunRice, Riviana, private label offerings and specialist participants such as Manassen Foods (Tilda) and Mars (Uncle Bens).

NSW rice exports are a small player in a global market, but is a significant player in the branded and supermarket-ready short and medium grain segment of the market. The market is dominated by multinational players whose competitive position is based on branding, both at retail and food service levels. Example of these players and their brands include:

- Ebro Foods with brands such as Tilda and Mahatma²²
- Mars Foods — marketed under the Uncle Bens brands
- Wilmar International — where the branding depends on the market across China and South-East Asia and the Pacific
- Louis Dreyfus Commodities — Allsome and Bella Lona Brands
- Archer Daniels Midlands (who own Californian mills and are largely commodity-based)
- American Rice Inc — who own the Abu Bint brand sold in the Middle East
- American Commodity Company — the California Select brand
- Olam International — with operations in Vietnam and Thailand.

In this competitive environment, there has an attempt by a food multinational to acquire SunRice. In 2010, Ebro Foods entered into an agreement under which it was granted exclusive rights to negotiate the purchase of 100 per cent of the capital of SunRice.²³ In 2013, Ebro Foods made an offer for Ricegrowers Ltd, for around 425 million euros (\$A602.92 million).

- The FIRB approved the Ebro buy-out of SunRice in 2011.
- Ultimately, Ebro did not get the 75 per cent of votes from A-class shareholders (they received over 50 per cent) and the takeover did not proceed.

Appendix B outlines how SunRice, as the holder of the SEEL, has evolved in the global market by:

- becoming a multinational food company
- adopting a strong branding and market positioning approach.

Similar to other multinational food businesses, SunRice developed a number of rice brands that include:

²¹ <https://corporate.sunrice.com.au/media/683706/sunrice-asx-information-memorandum.pdf>

²² Mahatma is a US brand owned by Ebro. In Australia, this brand name is owned by SunRice.

²³ <https://www.ebrofoods.es/en/news/ebro-foods-and-ricegrowers-limited-sunrice-sign-exclusivity-agreement-10-10/>

- SunRice and Sunwhite — across Australia and New Zealand, the Middle East and the Pacific Islands.
 - Currently, the SunRice brand uses both NSW and import product depending on availability.
 - SunRice also owns the Riviana brand in Australia — which is part of its International Rice segment, that imports rice as a secondary brand to Sunwhite.
- Solrais — in the Solomon Islands market owned by a SunRice subsidiary
- Trukai — in Papua New Guinea owned by the SunRice subsidiary Trukai industries
- Hinode Rice — which is part of the SunRice-owned subsidiary SunFoods (formerly the Rice Growers Co-op which includes the Woodlands mill).

3 Consultation summary

This chapter summarises the process and the key outcomes of the consultation that was an important input to this evaluation.

Stakeholders consulted

In total, across the NSW rice supply chain, the CIE evaluation undertook 39 separate meetings and workshops during the consultation that included engagement with 22 stakeholders who were contacted outside of the NSW DPI Rice Vesting review.

Appendix table C.1 summarises the consultation that was undertaken as part of this evaluation. For the Riverina/Murray rice industry, the CIE team attended 28 meetings and workshops that included:

- 1 formal meeting with the Rice Marketing Board (RMB) with informal intersections with RMB Board members who attended each of the RGA meetings
- 11 meetings/workshops conducted by the Rice Growers Association (RGA) — including informal chats with ricegrowers and industry suppliers before and after these meetings
- 16 contacts with ricegrowers and industry stakeholders of the southern rice industry — made outside of the NSW DPI Rice Vesting review.

For the Northern Rivers industry, CIE attended 9 separate meetings and workshops. In addition to a meeting with Northern Rivers Rice Growers Association (NRRGA) and Natural Food Co at their offices in Penrith, organised by NSW DPI, contact was also made with 7 ricegrower and supply chain stakeholders outside of the NSW DPI Rice Vesting review process.

As of October 2021, there have been two meetings with SunRice executives via video conference. Appendix C also summarises key outcomes from the formal events organised by the RGA and the NRRGA.

- Generally, the level of grower interest was low at RGA events. Average grower attendances varied between 5 and 15, which is small given a base of around 400 growers and the 558 A Class shareholders for the 2020 crop year.²⁴ In large production years, the number of ricegrowers was as high as 1 000.
- In the case of NRRGA, the majority of active growers attended the meeting and apologies were made for those who couldn't attend, albeit from a total population of around 30 ricegrowers.

²⁴ The SunRice Board exercised its discretion to maintain 558 A Class shareholders on the books for the 2020 crop year where technically only 102 growers qualified.

Key takeaways from regional consultation

Riverina /Murray region

Farm level

Agriculture in the Murrumbidgee/Murray rice quarantine zone is currently undergoing an economic renaissance — even when accounting for two years of reduced water allocations. With the prospect of 100 per cent allocations this year, this trend should continue.

- In fact, Murray Irrigation advised that their region has been a net importer of water — whereas there was widespread fear that water would be sold downstream to almond plantations.²⁵
- It is widely recognised that the separation of water from land, and the subsequent ability to trade water within and between regions, will continue to drive competition between rice production and other crops for water in the future.

Structural change relevant to the rice industry takes two forms:

- increased competition for both land and water across the range of enterprises that include rice, corn, cotton, almonds, walnuts, irrigated and dryland grains and fat lambs
- change in ownership structure of farms and land in traditional rice growing areas.

All rice farms are multi-enterprise operations that include a range of dependence on rice where:

- rice generally represented up to 80 per cent of total farm revenue pre-water reforms. Following reforms in the water market, some growers report they would obtain up to 40-50 per cent of their revenue from rice in a multi-enterprise operation.
- rice can also be opportunistic around core enterprises of lambs and grains (irrigated and dryland) and cotton (irrigated).

There can also be advantage in growing rice as part of crop rotation and as a disease break. Recently, there has been a trend to growing winter cereals that follow rice crops (utilising residual soil moisture). As was stated, rice is a good cropping option for late in the season if water is available. Also, it can be a good fit in cropping rotations as a disease break.

Disadvantages of rice that were identified by some of the growers consulted included:

- lower gross margins compared to other options
 - Some also identified a higher rotational gross margin with rice — rice is more suited to double-cropping compared to more resource-intensive alternatives such as cotton.
- the inability to lock-in multi-year contracts with SunRice through the pool.

²⁵ Personal communication, Murray Irrigation Deniliquin.

There is greater pressure on rice as an enterprise through increased competition for water (based on gross margins per megalitre). Anecdotally, a number of views were heard:

- there are a core of (older) ricegrowers that will plant rice to ‘keep the industry and region going’ to fully utilise their water allocation — and are unlikely to trade water away
 - In the majority of cases, rice growing requires significant investments in on-farm infrastructure (laser-leveling etc), however this land can be used for other cropping and also used in livestock systems.
 - These investments would also be a barrier to entry, however, the best rice land has already been developed for some time. New land that is being cleared is coming into almond and walnut plantations.
- younger managers who are ‘more focused on gross margins’ — grow cotton and particularly corn where multi-year contracts are offered.
 - It is also noted that SunRice now offers a fixed price purchase contract²⁶, however the terms of this contract are different to hectare contracts offered to other grain growers as the contracts relate to individual harvest years and have washout fees payable if the grower does not deliver 75 per cent of the regional varietal average (multiplied by the hectares contracted).

In the workshops, SunRice representatives indicated that they have had to respond to increased competition for land and water — which had translated to lower rice crops. Last production year, they offered a price of \$750 per tonne for a 45 kt crop — compared to the indicative pool price of \$350 per tonne. This increased price was designed to assist growers with the cost of water (especially those that had to buy-in water) and secure a minimal throughput to keep their mills open and running for the year.²⁷

The increased competition for land and water from horticulture and other cash crops such as corn and cotton, and transition from ‘traditional growers’ to corporates and younger managers with a greater focus on returns per hectare and megalitre, are important components of the overall economics at a regional level.

From the consultations, a clear message from the southern consultation was that most growers who attended presentations are satisfied with the current regulatory arrangements, including rice vesting and the export single desk, and the performance of the current supply chain. The majority of this support comes from small to medium growers.

Contact was also made with a number of ricegrowers who want to leave the SunRice Grower’s pool. Several reasons were identified:

²⁶ <https://www.SunRice.com.au/media/documents/Sample-SunRice-C20-Fixed-Price-HECTARE-Contract.pdf>

https://www.SunRice.com.au/media/documents/20200724_SunRice_C21-pricing_Letter-from-the-Chairman_FINAL-signed.pdf

²⁷ The observation was made that mills are expensive to reopen once closed for care and maintenance. Also, the Coprice and other byproduct operations depend on rice throughput.

- they believed that they could get higher paddy prices by developing or moving to another supply chain and through branding and marketing their own product; and related, there was a lack of transparency for milling and marketing margins
- they said they found the controls made possible by the vesting arrangements, including controls over the domestic market, were heavy-handed and provided high external visibility over their businesses
- the allocation of certified seed by SunRice was also seen as a significant barrier in terms of both quantities and varieties that were made available.

Regional and community level

In terms of contribution to the region and the community, many consulted indicated that rice and its value-adding was an important component of regional economic activity and livelihoods:

- SunRice presentations to growers and suppliers cited regional multipliers of 5 to 7, however the basis of calculation of these multipliers is unclear.
- Many expressed the view that without a single desk or vesting, this contribution could be much smaller if not zero with massive loss of regional employment and incomes.

Stakeholders consulted observed that SunRice has remained loyal to the region and were responsible, along with ricegrowers, for hundreds of direct and indirect jobs over the past 20 years — when other industries were limited.

- Sunrice directly employs between 400 and 500 persons across the Riverina/Murray regions across their storage, milling and packaging facilities and regional office. This employment contribution varies with the size of the rice crop, peaking at harvest time, and changes between years in response to the amount of paddy in storage that is available for milling.
- It was also noted that the industry base, especially around Leeton, is broadening around the growing horticulture sector.

Markets

Many of the forums attended highlighted the marketing strategies and successes of SunRice. SunRice, in their presentations, identified a number of premium markets for white and brown rice (both short and medium-grained) that include:

- the domestic market — which includes sales of primarily branded and value-added products
 - Like other companies of similar size, SunRice sell a number of brands targeted at different consumer/customer segments and price points.
 - This includes both domestic and imported rice where imported rice is sold under SunRice's secondary Riviana brand.
- New Zealand — which has been a steady low-volume market with freight advantage particularly over US product
- Middle East countries including Saudi Arabia. Recently there has been unfavourable market shifts in Jordan, Israel and Lebanon.

SunRice also identified a competitive and dynamic international market. For example, the relaxation of export controls on Egyptian rice was identified by SunRice board members as a key reason behind greater competition in the Lebanese market. It was also heard that traditional markets in the Pacific Islands — such as Papua New Guinea and the Solomon Islands — have not been accessed in recent years with Australian rice.

There are two reasons:

- insufficient product — in fact, there was insufficient product for other premium markets such as the domestic market, New Zealand and the Middle East — which required SunRice to import from their operations in other countries such as Thailand and Vietnam
- affordability of Australian rice — countries such as PNG that experienced a decline in their capacity to pay as a result of COVID and falling exchange rates that have seen them switched largely to lower-grade Chinese product.²⁸
 - Chinese bulk product was identified as costing around US\$250 per tonne which was then bagged for sale in SunRice facilities in Lae and Honiara.

It is also noted that SunRice has increased competition in the Pacific market with the entry of Singapore-based Wilmar into the rice market.²⁹ The competition takes the form of both branded and unbranded product — where media suggests the increased market share has come about through loss-leading and the acquisition of Goodman Fielders assets in the Pacific.

Price premiums

The SunRice presentations emphasised the gains from the single desk in terms of ability to capture price premiums, but the context for these were primarily relative to:

- other suppliers (such as the United States or Thailand); or
- their approach based on branding (compared to no branding).

Presentations acknowledged associated additional costs, such as retail-ready packaging and promotion (advertising and nutritional advice) in the premium Middle East markets.

Further, there was recognition that some markets will pay more than others depending on incomes and preferences. For example, the Middle East is recognised as a premium rice market by all global suppliers, not just by SunRice (and other potential exporters for Australia). However, it was also recognised that customers in the Middle East were more focused on product quality than, for instance, in the Pacific.

²⁸ A common explanation is that this product is medium grain rice that has been on storage from 1 to 3 years and has a higher broken percentage.

²⁹ <https://www.farmonline.com.au/story/6818481/sunrice-braces-for-discount-battle-with-wilmar-in-pacific/>

Trade barriers and other requirements are important

The RMB and RGA presentations frequently cited a distorted world market as a rationale for the single export desk, while stating that the domestic market was deregulated.

There are a number of different drivers of prices paid (and changes in differential) in what is a dynamic international trading environment. And, as SunRice identify, rice trade is declared as special as a result of its implications for food security — especially in the COVID era. Across export markets these arrangements vary and include:

- tariff-quotas and concessional arrangements resulting from free-trade agreements
- single importing agencies responsible for food security in priority staple groups — including controls on marketing, distribution and pricing
- restrictions on the processing and re-export of certain foods. For example, the imposition of martial law in Jordan has effectively banned re-export of food products.

Investment in brands and product positioning

From the SunRice prospectus and their presentations, branding and product positioning is a central strategy across the majority of their markets. Also, SunRice says it has evolved from being a commodity exporter and has moved to a branding and positioning approach so that they avoid, where possible, competitive tendering processes.

This transformation commenced in 2011 following the unsuccessful takeover by Ebro Foods of SunRice. SunRice market communication around 2015 showed that sales of branded product increased by 40 per cent between 2012-13 and 2015-16.³⁰

In addition, SunRice actively leverages Australia's clean and green national image as part of its overall consumer strategy (like most Australian agricultural exports). Other factors could include service levels into markets working with strategic alliances and customers, including better consumer support and information.

Northern Rivers

The regional category not only includes ricegrowers located around the Casino/Kyogle system but also includes their strategic alliance with Natural Food Co, who are located at Penrith.

Farm level

The Northern Rivers systems is a summer rainfall region, compared to the Riverina where rainfall is typically in winter and spring, where summer crops such as rice utilise

30

https://investors.sunrice.com.au/FormBuilder/_Resource/_module/2weQNICYSUy13FE_jxQXvg/file/nsxannouncements/2015/11/181115-sunrice-shareholder-roadshow-presentation-november_final-nsx-with-video-link.pdf

residual soil moisture from winter crops and are heavily supplemented with irrigation from before Christmas onwards. The crop profile includes:

- sugar cane (on the decline)
- soybeans
- corn
- barley, oats and some chickpeas.³¹

Dryland rice has become a good option for farmers in these districts from several perspectives:

- it is a good rotation option following winter cereals or corn/soybeans as a disease break
- it is an opportunity to plant late in the season given a wet summer;
- in some low-lying areas, rice is the only option for water-logged soil.

These factors indicate that rice presents a good value-proposition for growers who do not currently grow rice and to bring land that is currently unused, that is susceptible to water logging, back into production.

Similar to any other agricultural area, including the southern irrigated system, the more enterprises businesses can access, the more flexibility they have in adapting to shifts in the climate and in markets.

Milling, storage and marketing

As a point of difference to southern production systems, rice production in the Northern Rivers is not irrigated. This also means that yields can be highly variable between seasons and even between paddocks. Based on this production system, the product positioning of rice from this region is based on its sustainability credentials.

- For example, Slater Farms is a certified bio-dynamic rice producer, which has more niche characteristics than most of the production of the area of around 4 kt.
 - Natural Rice Co produced only 2 600t this year (from 25 growers) and less area (580 hectares) was sown than was contracted (12 to 33 growers) due to no early rain, but then 500mm in December.
- Growers identified their sustainability and environmental credentials based on their dryland (non-irrigated) production systems.

Natural Rice Co has received limited access to shelf space in the supermarket chains but also sells to a range of speciality outlets in retail and in food service.

Currently two businesses own rice drying and milling facilities in the region. They are currently working with Natural Rice Co at Penrith on important issues that impact on the regions' industry that include:

- restrictions imposed by the single desk

³¹ Some farms are also mixed enterprises running cattle on the non-arable parts of their properties.

- access to seed and development of new varieties.

One of these businesses, Slater Farms, mills for Natural Rice Co and other buyers. This has allowed them to have a mix of permanent employees and part-time staff.

Natural Rice Co has a storage site at Kyogle that can currently handle 6 000 tonnes of rice. Once upgrades are completed it will be able to handle 8 000 tonnes.

Current sales are to:

- selected chain supermarkets
- speciality retail including health food stores
- high-end food service.

Being small market players, gaining access to the Australian supermarket chains is a long and costly investment where there is likelihood of market pressure from incumbent suppliers based on both price and the terms of supply. Building long-term relationships with speciality retailers and restaurants is also costly but also involves relatively small volumes.

Therefore, access to multiple markets including those overseas is primarily a risk-mitigation strategy.

- When asked, both Natural Rice Co and Slater Farms indicated that export would be desirable if allowed, as product from this region, which includes bio-dynamic rice, is a unique product and does not require large scale due to the likelihood of shipping in mixed containers with other bio dynamic products.
- Natural Food Co markets speciality brown and black rice lines which in addition to the sustainability credentials differentiates it from the SunRice brand.
- In terms of which export markets could be accessed, these have not been investigated because of the single desk and the market incumbent. However, New Zealand and the higher-end Middle Eastern markets such as Saudi Arabia were identified as candidates. The United Kingdom was also identified as a result of increased access under the Australia-United Kingdom Free Trade Agreement (A-UK FTA).

All growers and suppliers in the Northern Rivers region — some 1 200 km from the Riverina — are not supportive of the current single desk arrangement. Several licensed domestic buyers have been developing new products, brands and rice varieties. Innovation and business security is key to their growth and longevity.

Previous attempts at integration with the southern industry

Under the current structure, one option that has been explored was the feasibility of providing paddy to SunRice for marketing. Delivery of paddy to SunRice has been trialled, involving a haulage distance of over 1 100 kilometres. In addition to the freight cost, which is paid by Northern Rivers producers, there were a number of constraints that made this uneconomic:

- transport of wet paddy over a 12-hour haul presented a fire risk (stack burn)
- failure to meet specifications for moisture at delivery resulted in downgrading to discounting of the load at delivery — sometimes downgraded to feed quality

After adjustment for freight and any discounts, stakeholders indicated that on-farm returns for paddy could be as low as \$25 per tonne if the paddy was downgraded to feed quality. Therefore, it is not an economic proposition to truck Paddy to Leeton.

Licensing of domestic buyers

The consultation process highlighted that the process of applying for, and maintenance of a domestic buyer licence is a key constraint to activity outside of the existing supply chain. Key points made by stakeholders include:

- depending on the applicant, the process can span several years and in one case, required legal intervention for a licence to be issued
- the application and renewal forms are onerous and require the supply of detailed information that includes:
 - intended production levels
 - levels of old and new season stocks (both paddy and milled)
 - the full contact details of supplying growers
 - the names and volumes of customers.

This information provides RMB with a detailed picture of the domestic market.

Pure Seed program

Several stakeholders consulted identified significant constraints with supply of certified seed.

Our understanding from the consultation is that growers are ‘allocated’ seed by variety based on two metrics:

- projected demand by market and market segment: where Reiziq is the main variety targeted at the Middle East premium market
- growers performance history in terms of success in growing the more challenging varieties.

Further supply chain constraints are created by the regulatory environment which does not allow farmers to store rice on their farm, for any purpose, unless they hold a domestic buyers’ licence issued by the RMB. This is an area of concern for many growers as they lack control over:

- the quantity of seed they receive
 - Growers from the Northern Rivers and the Riverina/Murray region indicated that they often received less seed than they require — either for a specific number of hectares or at an optimal seeding rate.
 - SunRice refutes this claim saying that growers are not sufficiently organised to order the required quantity of seed.
- the varieties to be grown
- if a ricegrower receives any seed at all. Traders also claimed that at times they have been short supplied, which has put their business at risk.

Key messages from the consultation

In both NSW regions, growing rice provides a valuable cropping option for farmers in multi-enterprise systems.

In the Riverina/Murray region, water reforms and subsequent trading and several low/no allocation years have significantly increased the competition for land and water for rice production.

- Low gross margins per megalitre of water for rice, compared to other enterprises, will continue to put downward pressure on rice production.
 - There remain a number of businesses in the region who commit their water allocations to rice, although this number appears to have fallen. However, there may be also a trend to using rice as an opportunistic rather than a core enterprise — depending on water availability.
 - While rice requires specific on-farm infrastructure, current land used by rice is significantly lower than that that has grown rice over the past 20 years, and therefore is not the binding constraint.
- However, there is a core of ricegrowers who are committed to using a large proportion of their water allocation to grow rice on a regular basis.
- From this group and wider regional community and businesses, there is strong support for SunRice and a belief that benefits are linked to the current vesting and single-desk arrangements.
- There is also a small group of ricegrowers who want the opportunity to leave the Grower's pool and develop their own brands and supply chains.

For the Northern Rivers region, rice provides the opportunity for an enterprise that has higher gross margins than the majority of current crops and provides the opportunity to bring land back into production that would be otherwise would be uncropped.

- The Northern Industry believes that there are opportunities for it to export, to diversify its market base, and has been constrained by the vesting arrangements.
- The Northern Rivers views itself as distinct from Sunrice, relying on its sustainability credentials, rather than being a direct competitor.
 - Integration with the southern industry was tested and failed, leading them to invest in their own supply chains.
- While there is scope to develop their business through RMB licencing of businesses as domestic buyers obtaining a licence was difficult and seed supply arrangements provided the existing supply chain with significant visibility over their business.
- Unanimously, ricegrowers and their supply chains in the region would like to be excluded from the NSW rice marketing arrangements.

4 *Evaluation methodology*

Approaches taken by previous reviews

There have been a relatively large number of reviews of export single desks in Australia over the past 20 years covering wheat, barley, sugar and rice. All these reviews have focused on the extent of export premiums, and subsequent flow-on of benefits to growers, as the primary rationale for maintenance of the single export desk arrangements.

There have been several reviews of the single-desk export arrangements for the New South Wales rice industry.

In 2016, the Commonwealth Productivity Commission³² found that premiums were limited to the New Zealand market, where Australia has a significant advantage on transport costs, and concluded that the claims of price premiums were overstated.

Shortly after, NSW DPI³³ found that price premiums exist, and the removal of vesting posed a risk to the ongoing ability to extract price premiums for NSW rice exports. This review also found that the vesting arrangements could:

- result in some unspecified part of a total price premium for NSW rice of between \$65 and \$120 per tonne
- be discouraging the future growth and development of the rice industry in Northern NSW.

NSW DPI approach

The approaches taken by the Commonwealth PC and the NSW DPI both relied on a statistical analysis that compared Australian export fob returns for rice with a benchmark — prices achieved by the Californian export industry.

- The price of rice exports under the base case (the Californian price) is compared to the NSW export price that has historically occurred under vesting (the historical price).
- All prices were measured in Australian dollars per tonne and the comparison is undertaken on a monthly and a financial year basis.

California was acknowledged as the direct competitor for the Riverina/Murray rice predominantly producing and exporting medium and short-grain rice. Egypt and China are also large producers and exporters of medium grain rice — Egypt has been subject to government exports controls that have recently been lifted.

³² Productivity Commission 2016, *Regulation of Australian Agriculture*, Report No. 79, November.

³³ NSW Department of Primary Industries 2016, *Review of Rice Vesting Proclamation*, December.

The NSW DPI study used data for Californian medium grain rice sourced from Creed Rice — weekly prices data in US dollars per tonne between January 2001 and July 2016. Monthly price data for NSW rice exports were sourced from Australian-sourced trade for the same period and measured in Australian dollars per tonne.³⁴

Key assumptions included:

- export prices are determined under the same market conditions — that is, the products are very close substitutes
- production costs at the farm are the same
- rice exports are marketed in the same way and exported to the same destinations; and
- price differences were normally distributed.

The NSW DPI analysis found that statistically, the price received for NSW rice exports is higher than for California.

- Between January 2001 and June 2016, a price premium was recorded for 147 out of 183 months, or around 80 per cent of the time.
- The remaining 36 months showed a price discount, with no observations equal to zero.

Sensitivity analysis was conducted by recognising differences in:

- production years between NSW and Californian industries (drought years were removed)
- production costs — Californian labour costs are lower
- packaging/marketing costs — a higher proportion of Californian product is exported in bulk.

While these factors were important differences between the NSW and Californian industries, a key conclusion was that they did not significantly impact on the DPI conclusions.

Products outside of rice

There are also insights from previous work that include reviews of the:

- Victorian and South Australian Barley Marketing Acts
- Wheat Export Accreditation Scheme and the Wheat Export Charge (in particular, the reports provided by Wheat Exports Australia) which were dismantled in 2012
- single export desk for sugar — until 2006 all Australian sugar sales and exports were compulsorily handled by a single desk called Queensland Sugar Limited (QSL) who controlled sugar contracting, export prices, storage, shipping and trading arrangements.

³⁴ Since 2006, Australian export volumes and prices have only been available across all markets. The ABS has marked exports to over 30 individual markets as confidential and is therefore not reported.

South Australian Barley single desk

In September 2000 the Government of South Australia extended the single-desk powers for the export of barley, granted to ABB Grain Export Ltd, however, under National Competition Policy (NCP) requirements agreed to review these arrangements at the end of two years of operation of these arrangements. A Review Panel assessed whether the single desk for barley produced a net public benefit that was not achievable through a more competitive set of arrangements, such that the continuation of the single desk could be justified under national NCP principles.

The rationale for the Act was that the Japanese market for Australian feed barley was both premium and government-controlled by the Japanese Food Agency (JFA) — therefore a single exporting entity was best-placed to maximise the return from this market and over all remaining (residual) markets. Without the single desk, individual businesses would compete away benefits (premiums that result from the quota and from high prices paid in the Japanese market).

Extensive analysis was conducted of the Barley Marketing Act 1993 which included economic modelling and review of this modelling by an Independent Panel. The single export desk was modelled using a Barley Export Model where ABB is modelled as allocating barley exports between different export markets in order to achieve price premiums in less price-responsive markets. While it captured price premiums relative to sales by ABB itself in different markets, it did not capture ABB price premiums relative to other suppliers in the same market. Key model assumptions included:

- Perfect price discrimination. That is, the single-desk operator has complete knowledge of demand elasticities across markets enabling it to move product from inelastic to more elastic markets increasing average export prices.
- Perfectly competitive counterfactual. Without the single desk, the market would revert to perfect competition with a large number of small operators. It was noted that with natural economies of scale in grain handling, this was unlikely to be the case.
- Japanese Quota. In this case, a demand elasticity of zero was used, ignoring the market power held by importing authority who has the option of importing product sourced from the United States or other suppliers.
- Feed-malt substitution. Although users have different specifications, substitution is possible at the margin especially for downgrades or when there is a large malting crop.

Key findings from the modelling included:

- over the period 1995-2002, ABB achieved an average export price premium of \$7 per tonne for feed barley, the margin by which its export pool price exceeded the hypothetical competitive price that would have prevailed in the absence of the single desk. This premium varied from year-to-year but showed no obvious trend.
- if it is assumed that the Japanese market is not special, the estimate of the export price premium drops from \$7 per tonne to \$2 per tonne. However, this ignored the role played by the JFA in regulating imports of feed barley
- the price premium was found to increase annual grower incomes by \$10 million on average — the benefit of the single desk which was partly offset by a loss of consumer

surplus of \$1 million, because higher export prices spill into higher prices for Australian buyers of barley

In the assessment of the findings, the Panel made several observations with regard to the definition of premiums.

- A premium is not simply a higher price received in one market compared to others.
- If a higher price is obtained because the total package of product, quality, service, delivery terms etc is preferred by the buyer, then part of the so-called premium is simply a recovery of the extra costs incurred in differentiating the product.
- If the pool price covers these costs and if market access is gained by the overall package delivered by the single desk, and if this return cannot be achieved in any other way, then a premium has been obtained.

The Panel also criticised the modelling approach, that compared the prices obtained by ABB with hypothetically derived competitive world prices, and not with prices obtained by rival sellers offering the same total package of services and quality of barley.

The key recommendation by the Panel was that ABB's single desk for barley exports should be deregulated, by means of a streamlined process in which ABB retains its single desk, but is opened to competitive challenge through a contestability process.

Victoria deregulated its export barley market in December 2000, and South Australia followed in July 2007.

Limits to market power

In the context of an earlier review of the Victorian and South Australian Barley Marketing Act 1993, CIE(1995)³⁵ identified that it may be possible to sufficiently control supply to take advantage of different demand characteristics across markets, in principle. Five essential conditions were identified for the single desk to realise a net premium from its market power.

- It must have the power to redirect supplies between markets.
- The demand characteristics between markets (elasticities) must vary sufficiently.
- The single desk marketer must know the differences in demand characteristics with a high degree of accuracy.
- It must also know the supply reactions of its competitors to any price increases it creates and be sure that its competitors do not or cannot increase supplies to the market where it has restricted supplies.
- The single desk marketer must be able to use this information to analyse complex interactions between all markets to optimise allocation to markets to achieve the net gains.

³⁵ Centre for International Economics 1995, *Review of the Victorian and South Australian Barley Marketing Act 1993, Under the National Competition Policy Review of Legislative Restrictions on Competition*. Final report prepared for the Department of Natural Resources and Environment, Victoria. December.

A large number of conditions where the ability of a single desk to extract premiums is diminished was identified. That is, when there are:

- no other or limited suppliers able to take action to erode the raised price in the ‘tight’ market
 - If the single desk is only one of a number of large sellers/exporting countries supplying the market, the potential to erode the power will be high.
 - This is especially the case where buyers have market power themselves.
- close substitutes in production and consumption
- large seasonal swings occur in supplies and in demand
- a range of many different qualities, product specification and time preferences
- volatile exchange rates and freight rates
- rapidly changing market conditions in the global market.

Without detailed knowledge of the factors, it is equally likely that a single desk could result in discounts, rather than premiums, compared to the case without a single desk.

This report also identified that any benefits could be comprised by the single desk exercising unreasonable buyer power — resulting in lower farmgate prices and higher charges, than otherwise would be the case. The extent to which growers are aware that they are receiving a ‘fair price’ depends on the transparency of prices and costs along the supply chain.

RMB estimates of benefits from the single export desk

As identified, the stated objective of the RMB is to ensure that ricegrowers receive the best possible returns from rice sold outside of Australia based on the quality differentials and attributes of Australian rice.

A report is prepared on the performance for the Board against its stated objectives and on the performance of SunRice as the holder of SEEL.

- Each year, the RMB commissions an independent verification of the benefits of the export single desk across two categories: export price premiums and freight-scale advantage.
- Each of these benefit areas should increase export returns on an fob basis — of which these benefits are shared between SunRice shareholders and ricegrowers through the Growers pool payments.
- The RMB publishes annually a public high-level summary of the verification report for growers —the supporting input reports go back at least to the 2012-13 crop year and have been prepared by Grant Thornton Australia (GTA) and Syneca Consulting Pty Ltd.³⁶

³⁶ Grant Thornton Australia Ltd, various years, *Verification of the export price premium and freight scale advantage report*, Commercial-in-confidence, prepared for the Rice Marketing Board.

Verification reports have been provided for this evaluation for:

- 2012-13 to 2016-17 — the GTA reports provide detail on assumptions used for the calculation on export premiums including recommendations for refining the estimates
- 2017-18 to 2020-21 — later Syneca reports were not accompanied by spreadsheets to show the calculations and therefore do not provide significantly more detail than publicly available information from RMB.

The focus of these RMB benefit calculations, and previous analyses of single desk arrangements, are export premiums —that result from the supply control, and more particularly control of supply to individual markets. However, box 4.1 identifies that the potential benefits could be wider.

4.1 Other potential benefits from current arrangements

In addition to export premiums, other potential benefits from these arrangements include the capability to:

- coordinate the supply chain — from the production and allocation of certified seed through to harvesting, storage and sale of the product — and the use of scale to minimise these supply chain costs. The benefits from freight-scale advantage are one example.
- organise and target industry investments in:
 - R&D required to develop new varieties that support improved productivity and branding
 - Agricultural extension — the provision of information that enables adoption of best practice and R&D outputs to enable farmers to maintain and improve productivity
 - branding, promotion and market development that differentiate their product from competitors in domestic and export markets based on unique product characteristics including recognition of Australia’s clean and green image.

A key question is if these benefits rely on the current vesting and single-desk arrangements or could be achieved by other means. In other agricultural supply chains, a range of business types and sizes coordinate their supply chains through strategic alliances while R&D and extension is coordinated through respective rural development corporations. It is also noted that as heard from the consultation, the concentration of market power and industry good functions in the single desk, may also impact domestic competition.

Syneca Consulting Pty Ltd 2021, *Verification of calculations of the export price premium and freight scale advantage – crop year report 2019*, Commercial-in-confidence, prepared for the Rice Marketing Board,

Export price premiums

The essence of the export premium calculation is the extent to which the average price of exports sales to each market or market grouping are above a competitor's reference price or benchmark. This premium is then multiplied by export volumes by market to estimate a benefit in dollar terms.

The premiums are calculated on the gross sales value (GSV) of SunRice export sales — which is measured at different points of the supply chain depending on the market and the available data sources. Benchmark or comparison prices are at different levels of the supply chain and include:

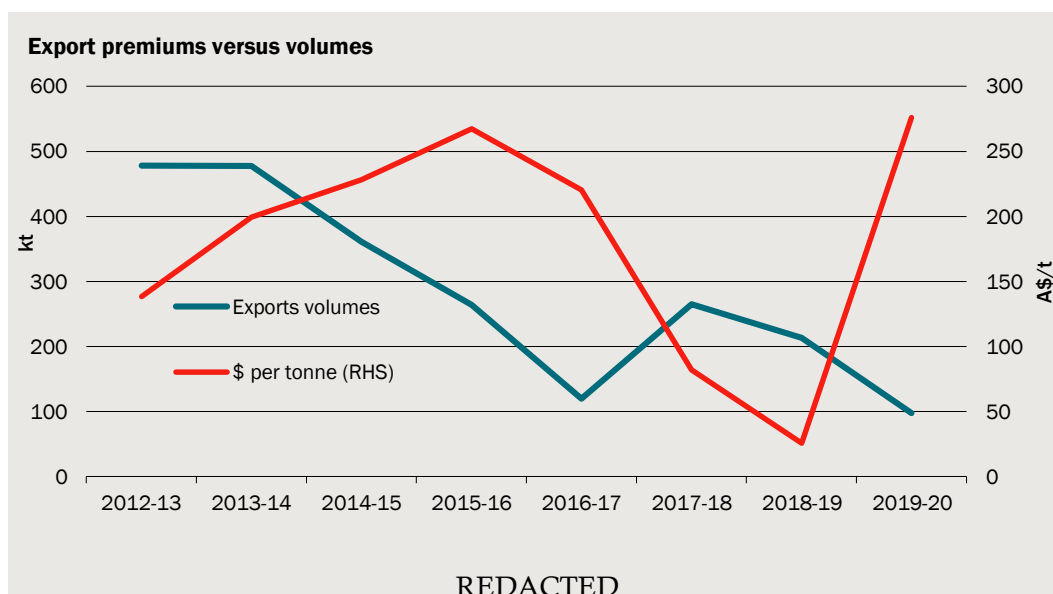
- prices of competitors products on an export free-on-board (FOB) basis with adjustments for freight, packaging costs and exchange rates to enable a direct comparison with SunRice product:
 - These FOB prices include US and Egyptian medium-grain rice — for Middle East and WTO markets, and Thai long grain and Jasmine rice for Pacific markets.
 - Information sources include the Creed prices series such as Thai B long grain price (5 per cent broken) ex-Bangkok — which is also available from the USDA.
 - We understand that these comparisons are primarily on an import cost-insurance freight (CIF) basis or delivered to an importers warehouse (that is, CIF plus applicable import duties and port handling charges).
- price survey information from sources such as AC Nielsen, or surveys of in-country distributors:
 - In these cases, the level at which these prices are measured could potentially vary. Typically, AC Nielsen measures retail pricing and volumes through either supermarket/outlet scanning or through surveys of home shopping.
 - A survey of distributors would typically involve wholesale prices unless the distributors are aware of, and include retail markups.

A more consistent approach would be to translate price differences to one uniform level — such as import cif or exports fob ex-Australia.

The export premiums calculated, and benefits attributed to the single desk by the RMB, are substantial. The first panel of chart 4.2 shows that over the past 8 years, average export premiums were around \$180 per tonne or around 20 per cent of the estimated export sales value. However, the benefit in dollar terms has declined as a result of lower export volumes (the second panel of chart 4.2) along with the market composition of the benefits. To 2015-16, the Pacific Majors (PNG and the Solomon Islands) were the major contributor to this benefit, which was benchmarked off Thai-B long grain rice.

From 2015-16, the Middle East grouping became more significant as a proportion of total benefit.

4.2 RMB estimates of export premiums



Data source: RMB.

Attribution to observed price differentials

Differentials between product prices in-market, for a commodity that is extensively traded such as rice, can be attributed to a range of factors, some of which are likely to be included in the validation report such as packaging and freight differences. However, there are also a range of additional attributes that, in reality, contribute to observed market prices. These include:

- supply chain costs: a product that is grown and milled in a high-cost area and that is stored to ensure year-round continuity of supply to customers will be higher cost than that grown, milled and sold on the spot market after harvest:
 - A supplier can only supply below marginal cost by loss-leading to establish market share, but this cannot be sustained over a long period.
- real or perceived quality including supply to specification
 - In the case of rice these attributes include the variety, the percentage of broken grains and dust in the product.³⁷
 - Medium-grain rice, in the context of world trade, is a speciality product that is suited to a range of cooking styles from traditional European dishes through to Levantine cuisine.
- the format of exports to each market that range from bulk (in containers and bags stowed in a ship's hull) through to bagged and packaged product
- the contribution of branding and product placement including the use of in-country promotion and advertising

³⁷ Our understanding is that the specification for the premium Middle East market is 4 per cent broken, and above that, discounts result whereas in the Pacific markets, for instance, where it is possible to include a more broken. Thai indicator prices show that product with 25 per cent broken trades at a 10 per cent discount to product with 5 per cent broken.

- In the case of rice grown in the Riverina and Murray, this includes the prominent use of Australian grown on the label and promotion of clean and green attributes.
- Branding and in-country promotion also involve additional costs that must be recovered in the final price paid by customers.³⁸
- service elements: customers will pay more for reliable and timely service and responsiveness to their changing requirements. The established supply chain aims to provide customers with year-round access to product — which involves storage and product management costs.

SunRice has identified that becoming a branded player in the Middle East region rather than a commodity exporter set SunRice apart from its competitors in California and Egypt.

They are not doing any work to inform the consumer on how to use the product or to inspire creativity. ...What we are doing is providing a total solution for the consumer, as opposed to the Californians, who are effectively taking a commodity, sticking it in a bag, putting a brand on it and flogging it in the supermarkets.³⁹

Another possible contributing factor is the capacity for the holder of the single desk to price discriminate between markets to increase the average export return across all markets — compared to the case where there are multiple exporters.

Freight scale advantage

In principle, this benefit area is possible because of the scale of total volumes shipped across the Growers' Rice pool (exported from Melbourne) and the International Rice business segments (from a number of loading ports for discharge in Australia and also export markets). Freight savings should translate to higher export fob returns — and therefore potentially passed back to growers in terms of higher pool prices.

The proportion of NSW rice exported relative to the total freight task is unknown. However, given recent export volumes of NSW rice and revenue from the International Rice segment the proportion is variable but has declined over the past decade especially in low production years.

- Since the 2016 crop year, SunRice run annual tenders for its anticipated volumes across both its Australian rice and international segments.
- Under the tender conditions, if these volumes are not realised, SunRice pays a penalty specified in the contract.

The benefits calculated for the RMB Grower's report are based on indications provided by freight companies for the cost of Australian-grown export volumes (by destination) compared to the total corporate volume shipped.

³⁸ It is noted that branding charges are deducted from the current Grower's pool.

³⁹ <https://www.smh.com.au/business/SunRice-eyes-iran-after-middle-east-sales-surge-20150728-gim256.html>

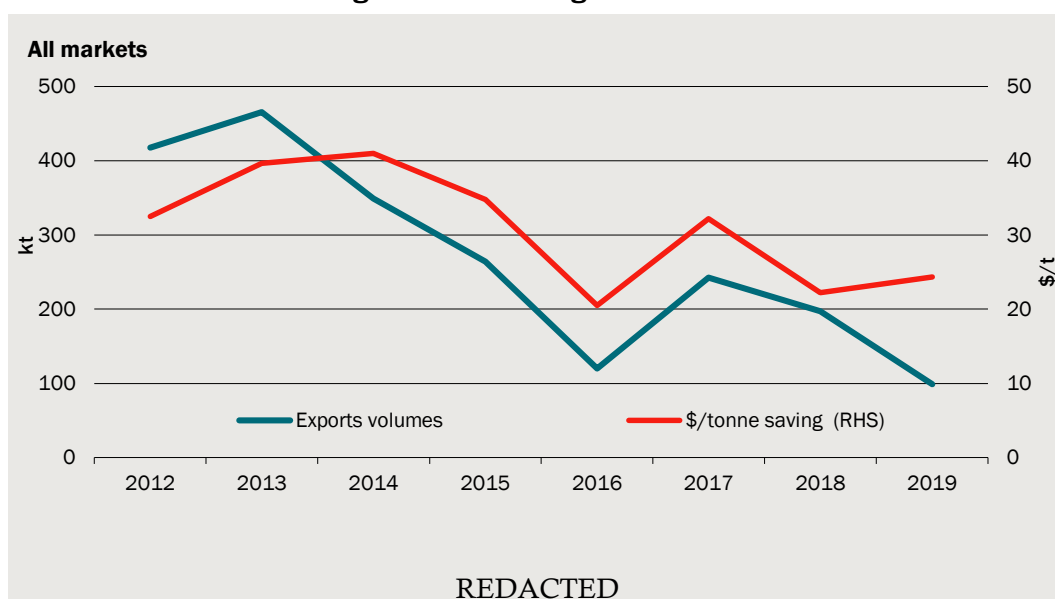
- Freight providers supplying data include: Maersk, Mediterranean, Hamburg Sud, Cosco and Swire. However, companies supplying data have changed over time. SunRice also use non-contracted freight providers.
- Some of these providers operate over a number of regions while others specialise in specific regions. For example, Swire Shipping specialises in the Pacific and Oceania routes including Australia, New Zealand, PNG, Solomon Islands and other Pacific Islands. Maersk and Mediterranean are used on the Middle East routes.

The RMB Grower's report shows that FSA dollar benefits are directly related to volume of NSW-grown rice exported over the period 2012-13 to 2019-20. Chart 4.3 shows that while export volumes declined as a result of declining product availability — the estimated average per tonne advantage, across all markets, varied between \$20 and \$40 per tonne.

- The low benefit outcome for 2016-17 is the combination of low export tonnage and a low average advantage across all markets of \$20 per tonne.
- The highest advantage estimated was for the 2014 crop year at \$41 per tonne, which corresponded to large export volumes to the Pacific Majors and Pacific Islands.
- In two of the key regions, the Pacific Majors and the Middle East, per tonne savings were maintained from 2013-14 to 2019-20 — despite falling Australian export volumes as SunRice substituted from other sources into these markets. For example, for the Pacific Majors, consumers were switched to Chinese product.

The RMB validation report provides little detail on how rates would change if different volumes were asked of freight providers, or the actual volumes shipped by each company.

4.3 RMB estimates of freight-scale advantage

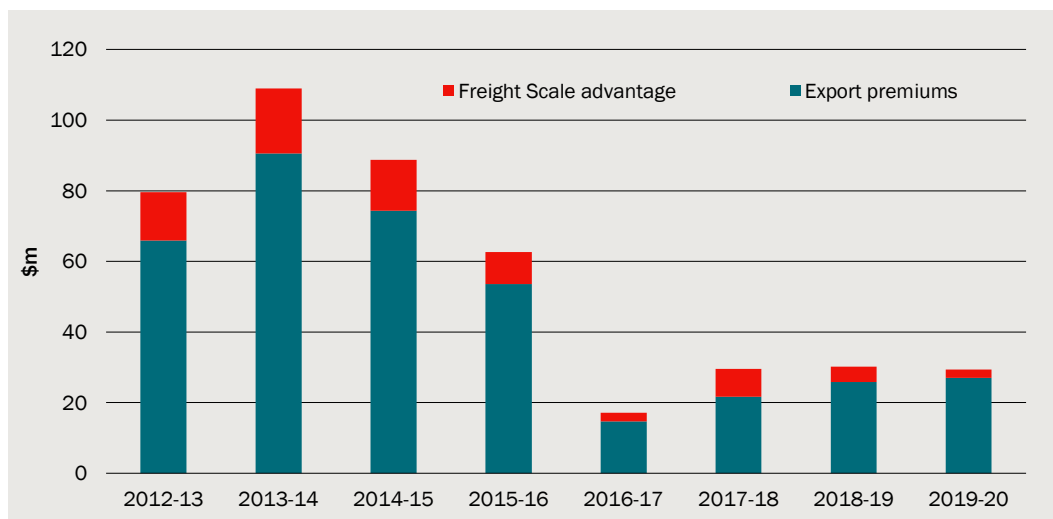


Data source: RMB Verification Reports 2012-13 to 2019-20.

Chart 4.4 shows that benefits, estimated by RMB, from the single desk are substantial, averaging \$60 million each year between 2012-13 and 2019-20. SunRice's approach of

combining freight tenders across business segments, makes it difficult to identify how much is attributable to the operation of the single versus SunRice's position as a multinational food business.

4.4 Total estimated benefits from export premiums and freight-scale advantage



Data source: RMB.

Approaches taken in this report

In the case of benefits of higher export prices that result from rice vesting and the export single desk, both the DPI and RMB approaches are designed to answer a different question than that which is required for this evaluation. It asks: what is the differential in returns between NSW rice and competitor products across all export markets? The rationale for the RMB analysis is to provide an indication that the value of Riverina/Murray region rice is being maximised across its markets. Similarly, the approaches by NSW DPI and the Commonwealth PC implicitly attribute differences between the average export received for NSW and US products to the operation of the single desk.

These approaches do not:

- directly answer what would be the impact on these prices of enabling access to these markets by more than one Australian exporter in a deregulated market; or
- account for a range of other factors that can contribute to observed price differences between products from competing suppliers located in different countries or products provided by the same supplier but differentiated by other attributes.

For FSA, the RMB benefit analysis does not necessarily show the benefits of an export-single desk — but the potential savings that would be possible where freight is organised by a large multinational business (who is the holder of the SEEL).

We need to ask similar questions to those identified in literature review — in regard to the contribution of other factors to export prices received — such as product attributes — and what the structure of the industry would look like without supporting regulations.

Improvements on previous approaches

For the RMB export premiums and FSA to be considered the ‘benefits’ of the export-single desk, then a required assumption would be that in a deregulated market, NSW rice exports would have the same attributes and quality as the direct competitors in each export market.

- For both export premiums and FSA, it is not necessarily true that if the export-single desk was deregulated, then these price differentials or freight savings would be eliminated.
- How they will change in practice, depends on what the new rice industry structure would potentially look like in a deregulated market.

The core of the approach taken in this evaluation is to develop realistic scenarios around what the NSW rice industry would look like after de-regulation including:

- the number and size of new players in the market
- which export markets would be targeted and their product mix.

Cost benefit analysis framework

The impact of each of the scenarios will be evaluated by an economic model of NSW rice export markets. Cost-benefit analysis (CBAs) will be used to bring the information together in a single framework consistent with Treasury requirements.⁴⁰

Data sources

What quantification is possible for this evaluation is based around the availability of data for the NSW rice industry — as this is a data-intensive task.

Information requested

A wide range of information was requested from the RMB and SunRice at the Consultation stage of this evaluation — as summarised in table 4.5.

4.5 Requests made to NSW RMB and SunRice^a

Request	Provided?	Status/comments/Alternatives
NSW Rice Marketing Board		
Annual Reports to NSW Rice Growers prepared by SunRice	✓	Publicly available on the RMB website
Detailed consultants’ reports: Verification of export premiums and freight scale advantage. Prepared for RMB ^b	✓	Confidential to RMB Provided by RMB to the DPI review and NSW Productivity Commission

⁴⁰ NSW Treasury 2017, *NSW Government Guide to Cost-Benefit Analysis, Policy and Guidelines Paper*, TPP 17-03 March.

Request	Provided?	Status/comments/Alternatives
RMB Board Minutes including decision to award SEEL	X	
Detailed market briefings provided to RMB by SunRice	X	
Industry stock levels as of June 2011 to 2021	✓	Provided by RMB to the DPI review and NSW Productivity Commission Does not distinguish between new season and carryover stocks
Detailed Service Level Agreement between RMB and SunRice 2019-2022	✓	Publicly available on the RMB website
SunRice (Ricegrowers Limited)		
Detailed export volumes by partner country and product	X	Volume information was available from the Consultants verification report for RMB and information on the gross value of sales by market
Rice production volumes by variety	X	SunRice and RMB indicated ranges of production by variety in consultation
Production configuration by package format (Bulk/bags/packs)	X	SunRice indicated broad trends during consultation but has not provided specifics
Indicative costs from farm gate to ex-mill by year (costs attributable to Growers' Pool)	X	
Indicative freight, insurance and agent fees from SunRice California operations to destination markets	X	
Freight cost to Port and Free on Board loading charges	X	
Freight scale discount calculations by year and market	✓	Available in Consultants verification report for RMB Supplementary information provided by SunRice
Submission to Rice vesting review 2021	X	
Consultant's Report 'RBB Economic Report'	X	

^a These requests were made formally through the DPI Rice Vesting Review. ^b Data tables not in the report but in spreadsheets were not supplied for the 2018 and 2019 crop year reports.

Source: CIE.

The requests comprised three broad groups including those required to better understand:

- the details behind the export premiums and FSA calculations
- current supply chain configuration from farm through milling to domestic and export markets
- decision-making by the RMB in terms of assessing the performance of the SEEL holder against key performance indicators in the service level agreement (SLA) and their understanding of performance by market or market grouping.

We note that Consultants' verification report for RMB was supplied for crop years 2012-13 to 2019-20. For the 2018 and 2019 crop years, the report referred to data tables contained in spreadsheets that were not supplied to this evaluation.

Alternative data sources used and approach to data gaps

A range of data sources were accessed during the course of this evaluation as shown in table 4.6. All but the Australian Border Force (ABF) data, RMB verification reports and FSA calculations are in the public domain. The key data sources identified include:

- The ABF detailed export data effectively substituted the request made for detailed export volumes by partner country and product in table 4.5.
- The Growers' Verification reports, especially those for 2012-13 to 2016-17, provided a significant amount of background to the key assumptions used in the calculation of export premiums and FSA.

Table 4.6 shows that trade data was used extensively to understand recent market performance of Australian rice in key export markets in terms of both price and quantity relative to its competitors such as the United States, India and Thailand. While high-quality monthly import data was available for New Zealand and WTO markets (Japan, Korea and Taiwan), only annual import data was available for the Middle East — and was generally of lower quality and consistency.

4.6 Data sources accessed

Description	Timeseries accessed	Coverage/Description	Source
Detailed Australian export trade data	<ul style="list-style-type: none"> ▪ 2011-2020 ▪ By shipment 	<ul style="list-style-type: none"> ▪ Detailed exports of milled rice by format (bulk, bagged and packaged) ▪ Includes both Ricegrowers Limited and other exporters ▪ Values and volumes 	<ul style="list-style-type: none"> ▪ Australian Border Force (Customs)
Middle East rice imports	<ul style="list-style-type: none"> ▪ 2015-2020 ▪ Annual only 	<ul style="list-style-type: none"> ▪ Saudi Arabia, Jordan, Kuwait, United Arab Emirates, Bahrain, Qatar ▪ By source country ▪ Value and volume 	<ul style="list-style-type: none"> ▪ UN Comtrade database ▪ General Authority for Statistics – Kingdom of Saudi Arabia
Asian rice imports	<ul style="list-style-type: none"> ▪ 2010-2020 ▪ Monthly 	<ul style="list-style-type: none"> ▪ Japan, Korea, Taiwan, Singapore, and Hong Kong ▪ By source country ▪ Value and volume 	<ul style="list-style-type: none"> ▪ Respective Customs and Statistics agencies in each country
New Zealand rice imports	<ul style="list-style-type: none"> ▪ 2012 to 2020 ▪ Monthly 	<ul style="list-style-type: none"> ▪ By source country ▪ Value and volume 	<ul style="list-style-type: none"> ▪ NZ Infoshare
US rice exports	<ul style="list-style-type: none"> ▪ 2012-202 ▪ Monthly 	<ul style="list-style-type: none"> ▪ Exports by country identified by rice type (including medium grain) ▪ By export market ▪ Value and volume ▪ California identified separately 	<ul style="list-style-type: none"> ▪ USDA Foreign Agricultural Service Global Agricultural Trade System. ▪ USDA State Agricultural Trade data
Global Rice market indicators and outlook	<ul style="list-style-type: none"> ▪ 2010-2020 	<ul style="list-style-type: none"> ▪ Rice export indicator prices for the United State, Thailand, Vietnam, and India by month ▪ Global production and import trends 	<ul style="list-style-type: none"> ▪ USDA Economic Research Service

Description	Timeseries accessed	Coverage/Description	Source
Export market strategies and trends	▪ 2011-12 to 2020-21	▪ Key developments and strategies in exports markets for Riverina/Murray rice.	▪ SunRice Annual Reports and Investor relations communications ▪ Grower verification reports
Ricegrower production, and water use	▪ 2001-2020	▪ Supplying farms, paddy production and average yield by district. ▪ System irrigation allocations, use and pricing.	▪ NSW Rice Marketing Board ▪ Murray Irrigation/ABARES Water Market Outlook
Growers Verification Reports	▪ 2012-13 to 2019-20	▪ Quantification of export premiums and freight-scale advantage from the holder of the SEEL.	▪ NSW Rice Marketing Board
Riverina/Murray supply chain information	▪ 2011-12 to 2020-21	▪ Growers Pool Revenue by market and Grower Payments ▪ Operating segment revenues ▪ Paddy pool pricing information	▪ SunRice Annual Reports and Investor relations communications

Source: CIE.

The development of a picture in key export markets also involved detailed export data across shared markets. This data separately identified:

- national FOB value and volumes by month
- medium and short grain rice from other lines

This was further supplemented by USDA State Agricultural Trade data to obtain estimates of export by the Californian region — the direct competitor for the Riverina/Murray Regions.

Table 4.2 also shows that a number of sources were used for the NSW Rice Industry.

- Public RMB data was accessed for the analysis production, farms and land harvested in the Riverina/Murray region.
- However, RMB data was incomplete for the Northern Rivers region in recent years and ABS data provided unreliable outside 2015-16 (the Agricultural Census).
 - Best estimates for the Northern Rivers were developed using information gathered from the consultation.

Analysis of market power

As identified in the literature review, one of the key questions and rationale for an export-single desk is the ability to manipulate sales across markets to increase average export prices above those that would be possible without the single desk.

This evaluation attempted a number of different approaches, no evidence of market power was found. Appendix D of this report provides details on the approaches that were tested but were restricted due to data not being available — or the relatively poor quality of the data that was freely available.

This was especially the case, where analysis of market power involved distinguishing between the outcomes of an export-single desk and those that would most likely result from the marketing strategy of a large multinational business.

Definition and measurement of market power

In economics and competition law, there are several ways to define market power. Market power refers to a company's relative ability to manipulate the price in the marketplace by manipulating the level of supply, demand or both. This is relative to the case where there is competition between several firms. The OECD ⁴¹ provides a more precise view:

Market power refers to the ability of a firm (or group of firms) to raise and maintain price above the level that would prevail under competition is referred to as market or monopoly power. The exercise of market power leads to reduced output and loss of economic welfare.

Lerner's index

The actual measurement of market power is, however, not straightforward. One approach that has been suggested is the Lerner Index — that is, the extent to which price exceeds marginal cost. In the case of Australian supply chains, the calculation of marginal cost would involve:

- the paddy price paid (adjusted for milling yield, byproduct credits and downgrades)
- milling and packaging costs (excluding overhead and shared costs)
- stockholding costs including adjustment carryover product between years
- freight to wholesale point or market.

Without access to detailed and specific information, marginal cost and even average variable cost is not easy to estimate for the comparison average export returns.

Another approach to assess market power is to estimate using econometrics, using the (inverse) of the price elasticity of demand facing an individual firm — since it is related to the firm's price-cost (profit) margin and its ability to increase price (see appendix D for details). If the Lerner index is zero or not significant, then perfect competition exists.

The analysis focused on two markets:

- New Zealand due to the high-quality monthly import data that was available and a long standing market of NSW rice. Other competitors included the United States and Thailand.
- Saudi Arabia — widely recognised as a premium rice market and an export market that has been consistently serviced by SunRice even in periods of low product availability. However, import data was annual and low-quality. The competitors included in the analysis included the United States and India.

Key insights from the results suggest for New Zealand suggest that:

⁴¹ <https://stats.oecd.org/glossary/detail.asp?ID=3256>

- the inverse of the demand elasticity for each supplier has the same order as their respective market share (demand is relatively more inelastic for the suppliers with the highest market share)
- there is imperfect competition in New Zealand but — this is likely to be based product differentiation (medium-grain versus long-grained).

Results from the Saudi Arabian model show that Australia faces a perfectly competitive market in Saudi Arabia. In Saudi Arabia, Australia occupies around 2 per cent of the total rice market share, and while it is recognized as a premium brand, the demand for medium grain may be more elastic relative to long-grain — which is a staple in Saudi Arabian cuisine.

Scenarios for evaluation

Based on the feedback from the consultation process, the scenarios that were identified in the terms of reference for this evaluation were further developed and refined into 4 scenarios as summarised in table 4.7.

The text that follows provides the rationale for how scenarios were brought together to enable the quantification of benefits and costs.

These scenarios are constructed to best reflect the information obtained during the consultation, along with the quantitative information collected as part of the project. Clearly, given that rice has never been deregulated in NSW, there is no existing data set that could be used to infer the results of such deregulation. However, the consultations indicate a variety of broad intentions, and economic and commercial logic suggests some bounds on the possible outcomes.

4.7 Summary of scenarios^a

	Remove export single desk	Complete domestic deregulation	Description/Comments
Retain the single-desk arrangement in its entirety			
Scenario 1a	X	X	▪ Baseline
Scenario 1b	X	✓	▪ Baseline with increased domestic competition (reform of rice vesting powers)
Removal of NSW rice-vesting and single-desk export arrangements			
Scenario 2	✓	✓	▪ Complete removal of current arrangements
Single desk geographically confined to the Riverina/Murray region with increase in domestic competition			
Scenario 3	Partial	✓	<ul style="list-style-type: none"> ▪ Export single desk maintained for Riverina/Murray region ▪ Increased domestic competition

Source: CIE.

1. Retaining the single-desk arrangement

As identified from the consultation, the current regulatory environment for NSW rice production is not just an export single desk but involves restrictions on growing and marketing NSW rice. These domestic restrictions are inextricably linked to the single desk, as ease of entry to the domestic market as well as the opportunities for additional scale from export are both necessary for the development of a competitive industry.

Scenario 1a (baseline)

The logical first option would be to consider the case where there is no change— that is the Act is retained in its present form. This is the baseline for the analysis where the RMB selects the holder of the SEEL and continues to regulate NSW rice production.

Given its established position and experience across each of the export markets, the current SEEL holder (SunRice) is highly likely to be awarded the SEEL again— at minimum of the first 6-year period if the current arrangements were to be renewed.

Scenario 1b

A variation on the baseline would be to retain the single desk in its current form but would introduce reforms to encourage more competition in the domestic market. This would include removing:

- the requirement that all NSW rice must be vested with the RMB via licenced buyers including the requirement for full disclosure of information to RMB
- the requirement that the holder of the SEEL be a buyer of last resort
- controls on supply chain, particularly the restrictions on the storage of rice on-farm.

Under this scenario, there would be easier entry to the domestic market, helping create additional competition for paddy supplied by rice growers. The holder of the SEEL would have to compete with other licenced buyers based on price. We note that feedback from the consultation indicated that the buyer of last resort did not provide any price guarantees to growers due to the use of minimum specifications at delivery. If these were not met, then discounts would be applied.

2. Complete removal of the single-desk export arrangement and domestic controls

In this case, the NSW Rice Marketing Act is repealed, with the RMB being dissolved along with its associated functions and regulatory controls. We note that from the consultation, there would be an adjustment issue of how to transition away ‘industry good’ activities from the current supply chain, such as the supply of certified seed and industry-based R&D, extension and data collection functions.

Two variations of this scenario were considered:

- no significant change in market structure in terms of one dominant NSW supply chain and smaller niche players

- possible entry of one or more medium to large businesses — as was identified in the case of the Californian rice industry.

Factors that shape potential market entry

Appendix E provides a discussion on the key issue of the extent of additional competition that is likely under de-regulation. There are two key considerations:

- the extent of investment in infrastructure and the market position of the existing supply chain in terms of attracting growers but also servicing customers in both domestic and export markets
- the cost of entry into the industry that is likely for businesses of different scales.

The conclusion from the analysis in appendix E is that the existing supply chain will continue to maintain a significant market advantage from its current infrastructure configuration which is likely to be significantly greater, in terms of storage and milling capacity, than what will be required for the foreseeable future. Another key factor is the size of the ricegrowing base and its variability. Given these sunk costs, and the uncertainty around rice production levels, it is unlikely that an additional major player will be attracted to the industry. It is more likely that a takeover would be a preferred outcome.

The emergence of the Northern Rivers industry has demonstrated that investment in rice storage and milling infrastructure at a smaller scale can be both cost-effective and scalable. There is no requirement to invest on a scale that was made back in the 1970s. In addition, there are also options where, given changes in regulation, drying and storage can take place on-farm and milling could be accomplished through an existing non-gluten milling facility.

The bottom line is that it is most likely that small to medium supply chains would evolve alongside the existing larger supply chain in a deregulated environment. This is especially the case where the consultation indicated the majority of smaller to medium ricegrowers supported the existing supply chain.

No significant change in market structure

After the consideration of these variations, scenario 2 was limited to the case where there would be no significant change in market structure in the Riverina/Murray regions and the incumbent business continues, either under current or different ownership, with the emergence of smaller niche supply chains.

- The current supply chain uses its established market position both at the growing/milling level in the Riverina/Murray region and to remain the dominant supplier of Australian rice in both the domestic and export markets.
- New entrants to the export market are likely to be small to medium volume and niche, based on a differentiated product to the existing supply chain.
 - This is the case as a small to medium supply chain will not be able to compete with the regional market power and resources of the incumbent business.

- Differentiation would be on the basis of varieties, branding and production method — based on attributes such as rainfed production, sustainably produced or have organic/bio-dynamic status or targeting specific market segments.
- These entrants would be from both the Northern Rivers and a breakaway Riverina ricegrowers. For example, in the Riverina, further development of speciality production or increased production of higher-value varieties. Growers not supplying the Growers' Pool would be marketing under their own brands.
- The established market player would remain focused on its branded products for Australian-grown rice and would continue to diversify its business base across its other revenue segments including actively substituting foreign rice in markets.

A logical variation to this scenario is where a multinational food or commodity business buys-out SunRice — as was suggested by the share offer by Ebro Foods in 2010.

- The likely outcomes would be like those outlined above where this supply chain would largely continue in its current form — but there would remain scope for smaller players to enter both the domestic and the export markets.
- A greater global presence and access to marketing channels across more countries may increase demand for SunRice branded product and increase freight savings when combined with other supply chains.

3. Single desk geographically confined to the Riverina region

This scenario maintains the export single desk for the Riverina/Murray region as the dominant producer of NSW price while encouraging increased domestic competition and providing the Northern Rivers supply chain with the opportunity to diversify its market base.

For this scenario, it is assumed that RMB vesting of rice and monopoly of the SEEL holder to export rice no longer applies for Northern Rivers producers.

- Rice produced and milled outside of the Riverina/Murray region can be exported freely — as is the case for rice grown in any other state such as Victoria.
- Approval and monitoring of licenced buyers by the RMB and regulations regarding the storage of rice by licenced buyers would no longer apply.

Approach to evaluate benefits and costs

Past approaches relied on the demonstration of dollar per tonne export premiums that result from the export single desk. For this evaluation, a different approach is taken that quantifies the impacts on prices received for each of the scenarios identified above. That is, what are the likely economic outcomes if other suppliers can access export markets.

This potential impact depends on several factors:

- the quantity of new product that is exported by market or market grouping — relative to existing supply of NSW rice but also medium-grain suppliers (including US product)

- the placement of this product in terms of branding and other attributes — and how consumers respond in terms of volumes and prices paid relative to the existing profile in the market
- how these existing players respond to the increased competition.

This analysis is brought together in an economic model that was specifically developed for this evaluation and that was developed around the available data. A description can be found in appendix G.

Baseline outcomes

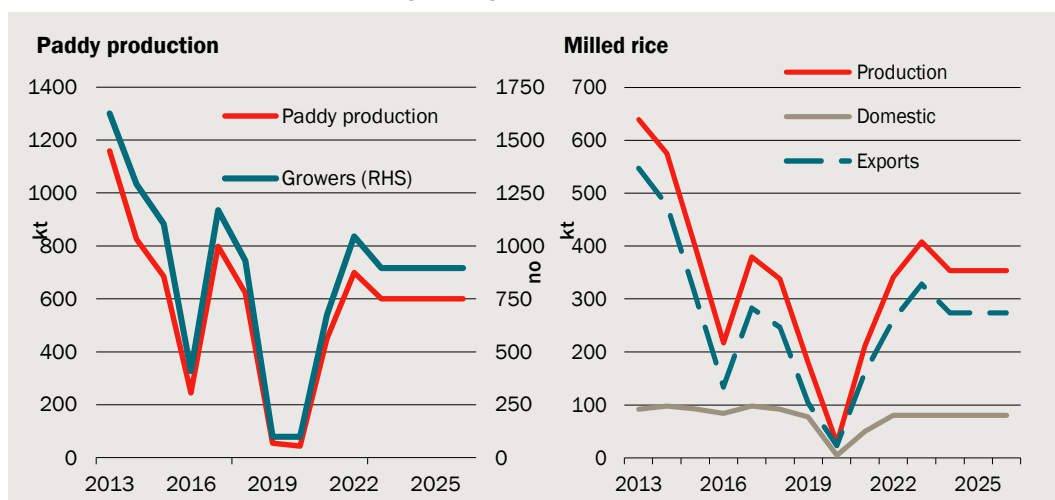
Typically, cost-benefit analysis that include market development and improvements in efficiency and innovation take a long-term view of up to 20 years. However, this evaluation was restricted to a 6-year perspective to the 2026-27 crop year for the following reasons:

- establishing a baseline that is a reasonable representation of the future is very challenging due to the inherent variability of rice production and exports and given dynamics in world markets. For example, rice production in each NSW production region has tended to move independently,
- a number of the inputs from industry relied on business plans with a short to medium-term perspective — involving not only investment but also changes in expected grower numbers and prices received and paid.

The analysis therefore is conservative and focuses on the adjustment path to outcomes that could be expected in a ‘normal’ production year for both NSW regions where 2026-27 is a steady-state or expected outcome. Given that it will take a number of years for the industry to adjust to changes in the regulatory environment and for new supply chains to establish, especially in accessing new customers and markets, it would be reasonable to expect to greater growth, and therefore additional benefits, beyond 2026-27.

Appendix F identified the key baseline information for the Riverina/Murray industry and sales to the domestic and export markets. It also describes the key assumptions used to develop the baseline for the next 6 years — based on the assumption of ‘reasonable’ paddy production levels for the Riverina/Murray region (chart 4.8).

4.8 Baseline for the Riverina by crop year^a



^a Projection from 2022 crop year onwards.

Data source: Appendix F.

On this basis, it is expected that paddy production will stabilise around 600 kt from the 2023 crop year onwards after a rebound in production to 450 and then 700 kt for the 2021 and 2022 crop years.

With core of domestic sales of around 80kt product weight, exports should stabilise around 275 kt product weight — or similar levels to the average export levels of 2017 and 2018. In terms of export markets, with expected levels of production, exports should resume similar patterns as seen in the 2017 and 2018 crop years, but with limited bulk exports to the Japanese SBS tender market (chart 4.9) representing a small proportion of total sales.

In the case of the Northern Rivers supply chain, the baseline focuses from the 2020 crop year forward (chart 4.10). In the baseline, without any regulatory change, this supply chain will attract a limited number of new growers over the next 6 years based on the higher gross margins available.

In addition, a baseline must be developed for the group of Riverina/Murray growers who could potentially leave the Growers' pool. Appendix table F.10 provides details for these producers who currently supply the Growers' pool and are therefore included in the baseline for the Riverina/Murray region. The following assumptions are made:

- the breakaway group would initially comprise 15 of the top-20 per cent rice producers in the region
- these producers have yields that are, on average, 20 per cent higher than district and have significant larger areas planted (some over 150 hectares) than growers outside of the top 20 per cent
- currently, these ricegrowers plant varieties in line with the marketing requirements of the current supply chain — predominantly the principle variety Reiziq
- these producers receive the same prices from the Growers' pool as do other ricegrowers.

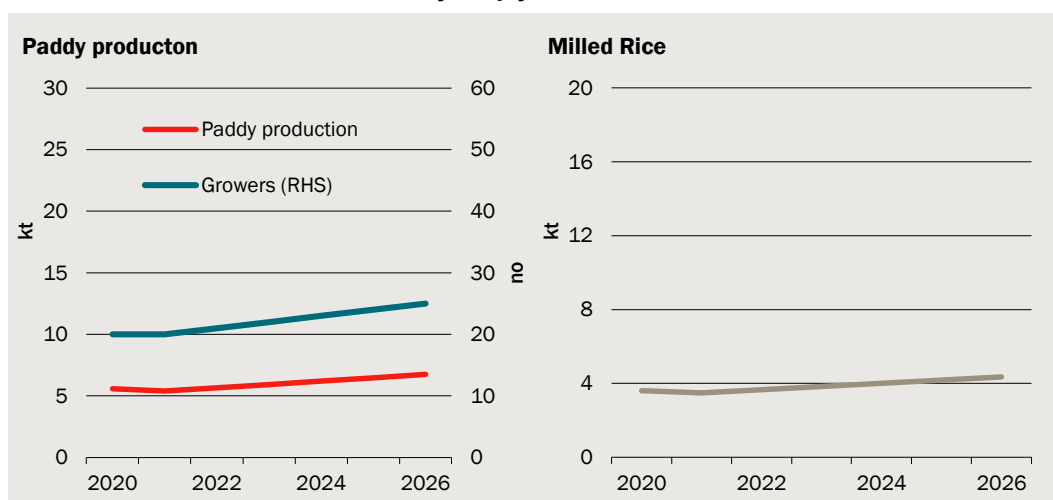
4.9 Riverina exports by major market grouping^a

REDACTED

^a Projection from 2022 crop year onwards.

Data source: Appendix F.

4.10 Baseline — Northern Rivers by crop year^a



^a Projection from 2022 crop year onwards. Same scale as chart 6.5.

Data source: Appendix F.

Impacts of deregulation

For each of the scenarios, the baseline volumes and/or prices were adapted to reflect the core scenarios. The detail of these scenarios can also be found in appendix F — however they involve simulating deregulation options by enabling:

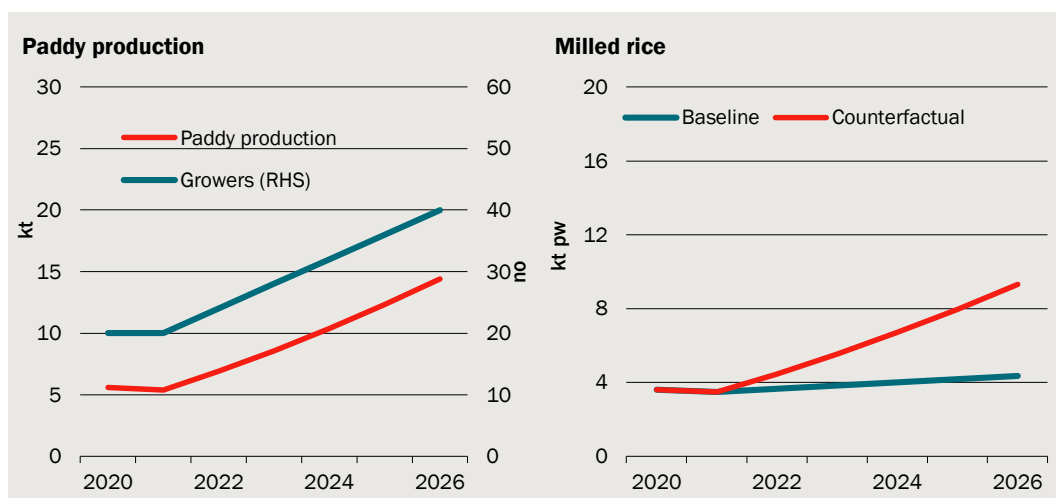
- increases in production for the key groups — based on greater access to markets
- greater competition for the existing NSW supply chain both in terms of loss of ricegrowers but also increased competition in their key markets, albeit in different product segments.

The impact of improved access, to each of the supply chains depends on:

- the extent to which deregulation increases production relative to the baseline and therefore scope for sales into domestic and export markets
- the extent to which the additional volumes displace competitors' product and/or reduces the average price received of Australian product in that market.

Chart 4.11 summarises the likely impact of partial regulation of domestic market on the Northern Rivers region. The principal impact is that the number of supplying ricegrowers increases from 20 to 40 over the next 6 years, resulting in total paddy production of 14.4 kt in the 2026 crop year (compared to 6.8 kt in the baseline). The production of milled product for sale increases to 9.3kt by 2026-27 — this represents 2.7 per cent of Riverina production. This production level is within the scope of planned capacity of the region to store and mill paddy.

4.11 Improved domestic access – Northern Rivers ^a



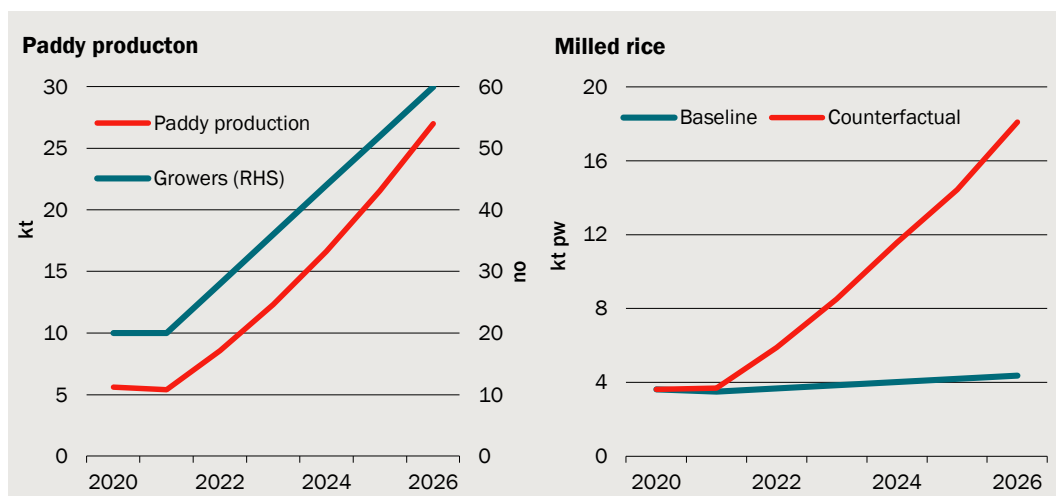
^a Projection from 2022 crop year onwards. Same scale as chart 4.9.

Data source: Appendix F.

Chart 4.12 provides the scenario with access to both the domestic and export markets. Increased confidence from the ability to diversify markets enables the supply chain to take on 60 growers and produce 27 kt of paddy over the next 6 years.

- We note that this paddy production level is around 50 per cent of the total 50 kt maximum potential level identified by Aither (2018). Over a longer period for adjustment, this response could be significantly higher.
- By the 2026 crop year, total milled product could be 18 or around 5 per cent of equivalent Riverina production.
- In this scenario, it is anticipated that the pattern of sales diversifies over time. Starting from its foothold in the domestic market, this supply chain would broaden to New Zealand first and later premium markets in the Middle East and Japan.

4.12 Improved domestic and export access – Northern Rivers ^a

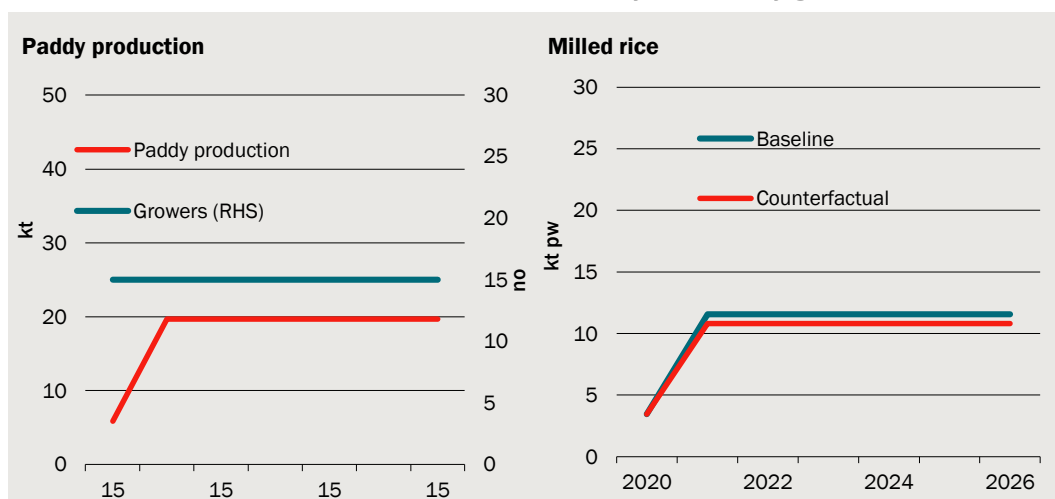


^a Projection from 2022 crop year onwards. Same scale as chart 4.9.

Data source: Appendix F.

Chart 4.13 summarises the equivalent scenario for the Riverina/Murray breakaway group for improved domestic access. Under this scenario, this group of growers reconfigure their production towards higher value but lower yielding varieties — where paddy production is likely to fall marginally relative to the baseline. However, as a result of expected paddy prices of around \$20 per tonne over those from Growers’ pool, farm revenues are expected to increase by 7.3 per cent compared to the baseline.

4.13 Improved domestic access – Riverina/Murray breakaway group

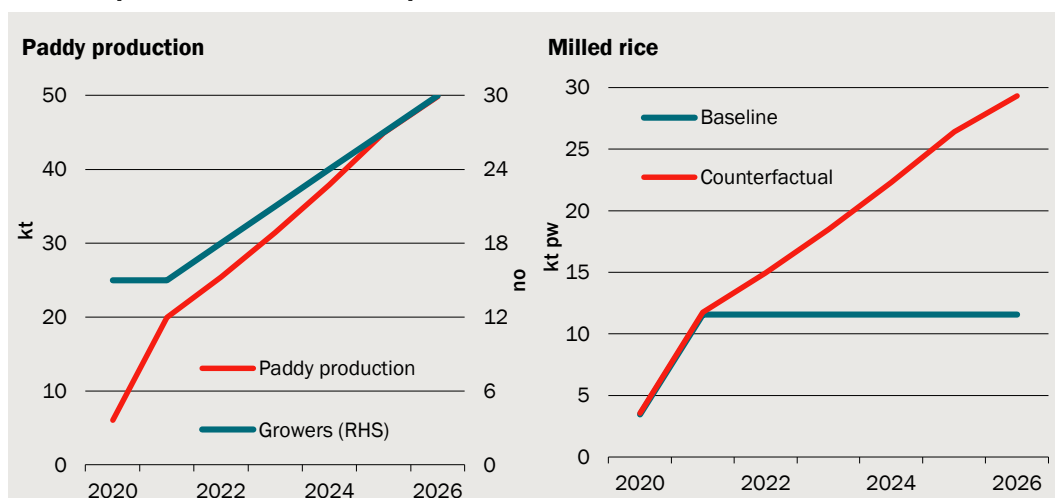


^a Projection from 2022 crop year onwards. Same scale as chart 6.4.

Data source: Appendix F.

Chart 4.14 shows that the opportunity to diversify markets should provide greater incentive for more growers to move away from the established supply chain. With 30 large and medium growers, the group could represent just under 50kt of paddy production or 8 per cent of the total in the Riverina/Murray in a normal year.

4.14 Improved domestic and export access – Northern Rivers



^a Projection from 2022 crop year onwards. Same scale as chart 4.9.

Data source: Appendix F.

In terms of sales across markets, increased production will initially be sold on the domestic market until export supply chains are developed.

The benefit for a group of ricegrowers currently located in the Riverina/Murray regions to leave the Growers' pool is that it would enable them to choose their own marketing approach and ultimately increase their average return for rice and farm revenues (see chart 4.13). This is achieved by:

- changing the mix of the varieties they grow (away from SunRice core varieties) to premium varieties
- increasing the average farm-gate return for premium varieties.

5 *Evaluation findings*

This chapter summarises the outcomes of the quantitative analysis of the scenarios in table 4.7 and that have been developed in appendix F. Rather than test for the existence of export premiums and FSA, the approach taken was to quantify what would happen to exports prices and FSA for all NSW rice given the evaluation options and the scenarios that have been established.

The detail of the scenarios is designed to be a reasonable presentation of a range of information, but of course it is not definitive, and other outcomes are possible. However, it is unlikely that the qualitative findings would be changed if the details of the scenarios were to change. The key fact is that there are growers who would like to export directly, or to compete in niches in the domestic market and who, in some cases, are keen to leave the current arrangements. These facts strongly suggest that deregulation will lead to an increase in output. The modelling then suggests that this will in turn lead to a net increase in the overall value of production.

Quantitative results

Detailed results are provided in appendix H of this report. Table 5.1 provides a summary of the impacts involving benefits and costs to the NSW rice industry for the headline results. These impacts are measured as changes in sales to domestic and export markets at an export fob equivalent level over the period 2020-21 to 2026-27 — by each of the NSW rice supply chains. The net present value (NPV) of these changes is then estimated to provide a summary estimate of total benefits and costs.

Two different options were quantified around the extent of substitution between the new and existing products in each of the market reflecting differences in quality and market positioning.

- Low substitution. This is best-case scenario where expenditure by consumers increases to pay for the new product and does not significantly displace its competitors which includes both other NSW product but also medium-grained rice from the United States.
- Moderate substitution. This case is where there is some increase in expenditure in each market — which results in some substitution of the additional product. This is headline analysis for the evaluation.

The case where new products are high or perfect substitutes was not considered: it would be difficult to justify a business case that involves direct competition in markets with a significantly larger competitor who also sells under Australian branding, as well as competing with suppliers from other countries.

Where a competitor's product is displaced from one market, this results in lower price received and either a diversion of the product to another market (where this is possible if there is access to exports) or a reduction in supply. While the detailed results are in appendix H, this chapter reports results for the moderate substitution case, as this has the greatest impact on relative prices and are used as the headline analysis and therefore likely to be conservative.

5.1 Headline impact on value of sales— moderate substitution

	Existing supply chains	Expansion of existing and new supply chain	Total for NSW rice
	\$Am	\$Am	\$Am
Scenario 1b			
– Northern Rivers only	-2.4	14.3	11.9
– Riverina/Murray only	-27.1	57.6	30.5
– Both regions combined ^b	-29.6	71.9	42.4
Scenario 2			
– Northern Rivers only	-4.2	37.4	33.2
– Riverina/Murray only	-57.1	119.4	62.4
– Both regions combined ^b	-56.1	137.6	81.5
Scenario 3			
– Northern Rivers only	-4.2	37.4	45.0
– Riverina/Murray only	-27.1	57.6	30.5
– Both regions combined ^b	-31.3	95.0	63.7

^a Net present value of domestic and export sales and FSA over the period 2020-21 to 2026-27 using a discount rate of 7 per cent. ^b Result for combined regions may not be the sum of each region due to cross-price effects through markets. That is, Northern Rivers only shows the interaction with the existing supply chain that includes the Breakaway group. The combined results are the outcome between all three groups after price adjustments by market.

Source: Appendix H.

Scenario 1b — domestic deregulation

In the case of scenario 1b, where the growers have greater capacity to develop a business plan for the domestic market, the benefits over the next 6 years are relatively modest compared to the size of the industry. Using a conservative scenario around scope for expansion in the Northern Rivers region, and where this new product does directly substitute for existing NSW product, the gains in the present value of sales by 2026-27 is \$14.3 million.

For the breakaway in the Riverina/Murray system, the present value of their sales could be \$57.6 million higher. This value is the result from the diversion of product away from the existing supply chain and a higher return.

In total, the increase in the present value of sales would be \$71.9 million across each group, however, this involves a reduction in the value of sales of the existing supply chain of \$29.6 million — principally the result of diversion of product to the new supply chain.

This leaves an overall improvement at an industry level of \$42.4 million over the period to 2026-27 — or a 2.7 per cent improvement over the baseline scenario.

Scenario 2 — complete deregulation

For the Northern Rivers and the breakaway group in the Riverina/Murray region — where their products are moderately differentiated from existing product on the market — benefits under scenario 2 are more than double compared to the case of domestic deregulation only. The present value of the sales of both of these groups could increase to \$137.6 million by 2026-27 — with 87 per cent of this increase attributable to the breakaway group in the Riverina/Murray region and the remainder to the Northern Rivers regions. This is based on the potential increases in production and premiums identified in the development of the scenarios.

This is offset by a reduction in sales through the existing supply chain of \$56.1 million resulting in an overall improvement of \$81.5 million at an NSW industry level over the period to 2026-27. This is equivalent to a 4 per cent improvement.

Scenario 3

Scenario 3 provides an intermediate outcome between partial and full regulation where the net benefits in terms of sales are \$63.7 million or a 3.1 per cent improvement at an NSW industry level.

Summary of results

The analysis has found that reforming rice vesting would create net economic benefits through an increase in value of domestic and export rice sales:

- Benefits are greatest where removal of rice vesting is combined with domestic regulatory reforms which increases the ability of the industry to diversify its market base, compete with other suppliers and innovate with products based on new varieties, production methods and branding.
- A loss to existing supply chains is more than offset by the expansion of new supply chains in the Riverina and Northern Rivers.

There is a significant amount of uncertainty around components of evaluating the benefits and costs of each scenario. As identified, this uncertainty includes base data, how respective supply chains would respond under each of scenarios evaluated, and how markets would respond. Therefore, given these uncertainties, the approach that was taken is necessarily conservative.

- However, we are certain about the direction of the impacts (that is, positive benefits to the NSW rice industry) — as this has been strongly supported by stakeholder feedback and the economic modelling.
- There is no evidence that supports the ability of the SEEL holder to deliver export prices above those that would be reasonably expected by a large multinational food company (rather than many smaller businesses).

The key drivers of these results recognise that:

- the potential Northern Rivers production area is significant relative to its current production size and the scale of the industry in the Riverina/Murray region.
 - Due to its separation from the southern industry, it has the potential to develop independently without a significant impact on the existing supply chain.
 - The opportunity is to further develop an industry that has already grown from a very small base in the past 10 years.
- businesses who choose to leave the Grower's pool in the Riverina/Murray region will do so because they believe they can receive higher returns from improved branding and marketing of their own product and have greater visibility over supply chain costs
 - Whereas the decision currently is to either to grow or not to grow rice and to move the use of their water allocation to other enterprises.
- for the existing supply chains in the Riverina/Murray region, the loss of throughput and pool sales will reduce revenue across all markets in the first instance and then in relation to the additional competition faces in each of the export markets identified
 - The most effective response by the incumbent would be to improve paddy prices paid and to offer longer-term contracting arrangements to growers.

Impact on Freight Scale Advantage (FSA)

Given the reliance on the RMB growers report for baseline benefits, changes from baseline need to be estimated for each of the options. Detailed analysis of changes in FSA are detailed in appendix H.

In terms of the outcomes for baseline export volumes and FSA estimates:

- the case where the Northern Rivers producers can export will not directly impact on the existing baseline FSA benefits, however
- the breakaway group in the Riverina/Murray will reduce export sales volumes for the existing supply chain.

An approach was taken that reflects the nature of these benefits for the existing supply chain.

- Lower freight volumes result in a lower benefit when the per tonne savings are held constant.
- In addition, the per tonne advantage is also reduced in line with lower export volumes by market grouping used in the RMB analysis.

For this analysis, changes in FSA are treated as being equivalent to changes in export fob prices — which exclude the cost of international freight. Three variations were considered where exports volumes by the existing supply chain were reduced by:

- maximum or first round export volumes by both the Northern Rivers and the Riverina/Murray Breakaway group — which amounts to a total of 22.8 kt by 2026-27 across New Zealand, the Middle East and Japan (that is, these exports displace those from the existing supply chain)

- the export volumes indicated by the economic modelling under the moderate substitution case that fall by 6.7 kt for scenario 2 and 1.6 kt for scenario 3.

For scenario 2, given moderate substitution, export volumes of the existing supply chain fall by 6.8 kt (see table 5.2), the total value of FSA in 2026-27 for the existing supply chain will fall from \$5.57 to \$ 5.12 million — a reduction of -\$0.44 million or 8 per cent. In the case of scenario, where the single desk is retained for the southern region, the loss in 2026-277 falls to -\$0.1 million (see appendix H).

The analysis suggests that the claimed FSA benefit would largely be retained should rice vesting be removed, albeit with a small reduction of \$-1.35 million for scenario 2 (see table 5.2) in NPV terms over the period 2020-21 to 2026-27. For scenario 3 this NPV falls to just -\$0.53 million (see table H.16)

5.2 Most likely reduction of FSA for existing supply chain under scenario 2^a

		NPV ^a	2020	2021	2022	2023	2024	2025	2026
Average FSA rate									
Baseline	\$/t		17.56	28.25	24.94	24.28	22.85	23.53	23.53
Scenario 2	\$/t		17.56	27.61	24.37	23.68	22.01	22.31	22.30
– Change from baseline	\$/t		0.0	-0.6	-0.6	-0.6	-0.8	-1.2	-1.2
Total export volumes									
Baseline	kt		24.8	110.7	207.1	268.9	248.2	236.7	236.7
Scenario 2	kt		24.8	108.6	204.2	265.0	243.3	229.9	229.9
– Change from baseline	kt		0.0	-2.2	-2.9	-3.9	-4.9	-6.8	-6.8
Value of FSA									
Baseline	\$m	25.21	0.44	3.13	5.17	6.53	5.67	5.57	5.57
Scenario 2	\$m	23.86	0.44	3.00	4.98	6.27	5.36	5.13	5.12
– change from baseline	\$m	-1.35	0.00	-0.13	-0.19	-0.26	-0.32	-0.44	-0.44

^a Net present value of domestic and export sales over the period 2020-21 to 2026-27 using a discount rate of 7 per cent.

Source: Appendix H.

This finding is consistent with that for export premiums, where any benefit is more likely to be attributable to the size and structure of the existing supply chain than from holding the licence for the export single desk.

Total impact of scenarios evaluated

Table 5.3 summarises the benefits and costs of the scenarios evaluated across both impacts on export prices and freight-scale advantage.⁴²

⁴² Note that scenarios that combine the impact of both the Northern Rivers and the Riverina/Murray breakaway group will not equal the sum of the components due to cross-price effects.

5.3 Headline impact on value of sales and FSA — moderate substitution^a

	Existing supply chains	Expansion of existing and new supply chain	Reduction in FSA	Total for NSW rice
	\$m	\$m	\$m	\$m
Scenario 1b				
Northern Rivers only	-2.4	14.3	0	11.9
Riverina/Murray only	-27.1	57.6	0	30.5
Both regions combined ^b	-29.6	71.9	0	42.4
Scenario 2				
Northern Rivers only	-4.2	37.4	0.0	33.1
Riverina/Murray only	-57.1	119.4	-1.3	61.0
Both regions combined ^b	-56.1	137.6	-1.3	80.2
Scenario 3				
Northern Rivers only	-4.2	37.4	0.0	33.1
Riverina/Murray only	-27.1	57.6	-0.5	30.0
Both regions combined ^b	-31.3	95.0	-0.5	63.1

^a Net present value of domestic and export sales over the period 2020-21 to 2026-27 and FSA using a discount rate of 7 per cent. ^b Result for combined regions is not the sum of each region due to cross-price effects

Source: CIE.

For the headline results, each scenario provides a positive net benefit but small in relation to the scale of the NSW industry in what could be reasonably expected to be ‘normal’ production years.

In each scenario, there are modest net benefits — which are maximised in scenario 2 with access to both domestic and export markets. The present value of improvements in domestic and export sales over 6 years to 2026-27 amounts to \$80.1 million or a 3.9 per cent improvement domestic and export sales to the NSW rice sector.

This analysis only incorporates some of the benefits from innovation associated with the development of new products — both from rice and its coproducts — based on conservative estimates around the potential for change in the medium term.

- Benefits also include the ability for businesses to develop their own brands and marketing approaches — and sell into the same markets that rice producers in other Australian states and countries can access.
- While the benefits are moderate compared to the size of the industry, the current arrangements are clearly restricting competition and innovation, and that there are opportunities available to diversify and grow the industry base. This observation is supported by the feedback received from stakeholders.
- While the outputs of the modelling have not been able to incorporate all of the benefits from innovation, the size of the true benefits would be larger than those identified in table 5.3.

A related but separate question is what proportion of these benefits would be handed-back to growers at farm level — after milling margins and marketing costs are accounted for. A reasonable observation is that from a growers' perspective the benefits of moving away from the existing supply chain and arrangements would be expected to match, at minimum, and exceed those from the grower's pool otherwise the incentive to leave would be limited to having greater autonomy in business decisions when they choose to grow rice.

Longer-term benefits are expected to be much larger

As noted, the 6-year timeframe of the benefits for this evaluation was limited by a clear understanding of what a baseline for the NSW rice industry would look like into the future but also by inputs from industry on how supply chains are likely to evolve in terms of numbers of growers and expansion in production. Therefore, the benefits estimated are clearly conservative.

- Given that 2026-27 is a representation of outcomes that could be reasonably expected in a 'normal year' with the maximum impact of the existing and new supply chains, the results in present value terms would significantly underestimate the net benefits of each scenario if a longer timeframe were considered.
- In each year following 2026-27, the annual benefits would be expected to vary around the 2026-27 results in line with changes in production in both NSW regions and with global trading conditions and prices.

Other issues for consideration

The consultation identified that were several key issues that were additional to rice vesting and the export single desk. These were primarily around the provision of industry good functions that include:

- breeding, production, and distribution of certified rice seed
- the delivery of extension services to ricegrowers ⁴³
- the collection and publishing of industry statistics.

The current structure and funding of the Pure Seed program was seen as a significant constraint, especially in combination with current regulations that restrict the holding of rice stocks to licenced domestic buyers. This is particularly in comparison to the case where free access to the production and sale of certified seed and the ability to store grain on-farm for the purposes of retaining seed are normal business practice across the grains industry.

Under current arrangements, control of the breeding, growing and distribution of certified seed lies with the existing supply chain. A key question is how the arrangements for the development of new varieties and the organisation of the production of certified seed should be organised in absence of the current arrangements. Similar questions also

⁴³ Extension is the provision of information that enables adoption of best practice and R&D outputs that enables farmers to maintain and improve productivity.

apply for on-farm extension and other industry good function which are targeted at some regions and not others — even though all NSW ricegrowers pay levies.

With resolution of these issues, it is likely that the net benefits identified in this chapter are conservative and could increase over time with a transition to new industry structures that provider growers and their supply chains with more operational flexibility not only in how they sell their product but also how they produce it.

Regional impacts

The preceding analysis estimates the impact on sales at a value chain level. How these changes translate to regional impacts depend on two broad pathways:

- how these changes are shared between growing and milling sectors — depending on changes in milling-level costs and paddy pricing offered to growers
- investment and employment undertaken by the new entrants.

Table 5.4 sets out some of the dimensions of how impacts for each of the regional groupings could be determined.

5.4 Summary of region impacts of deregulation scenarios

Regional/industry level	First round impacts	Flow-on benefits/impacts
Riverina/Murray — farm level		
Breakaway group	<ul style="list-style-type: none"> ▪ Transfer of paddy to the new supply chain ▪ Expected higher returns and greater control over business decisions 	<ul style="list-style-type: none"> ▪ Improved gross margins and capacity to pay for irrigation ▪ No significant change in enterprise configuration given reasonable 'irrigation year' ▪ Attraction of additional growers depends on paddy price and perceptions of supply chain performance
Other ricegrowers	<ul style="list-style-type: none"> ▪ Initially, small change in pricing of milled rice is expected. ▪ However, outcome at farm level dependant on paddy pricing policy of the existing supply chain — after changes in milling/marketing costs and terms and conditions of supplying the growers pool 	<ul style="list-style-type: none"> ▪ Small changes in returns to milled rice are unlikely to be undistinguishable from other climate and market drivers. ▪ Lower throughput and higher costs may be passed back to growers through lower paddy prices. ▪ Alternatively, to maintain and encourage more production, the more effective response would be to offer higher prices to match the new supply chain and maintain competitiveness with other water uses
Riverina/Murray — drying, storage and milling		
Breakaway group	<ul style="list-style-type: none"> ▪ Investment in on and off-farm infrastructure of up to \$20- 25 million. ▪ Additional employment estimated to be up to 20 FTE 	<ul style="list-style-type: none"> ▪ Impact depends on where infrastructure is purchased — silos, augers and sheds likely to be purchased in the region

Regional/industry level	First round impacts	Flow-on benefits/impacts
		<ul style="list-style-type: none"> Specialised milling equipment likely to be imported from outside of the region and from overseas
Existing supply chain	<ul style="list-style-type: none"> Loss of throughput to both established mills (see text for detailed discussion). 	<ul style="list-style-type: none"> Flow-on impacts dependant on corporate decision-making relative to the baseline to balance increases in operation costs against changing the paddy return.
Northern Rivers		
Farm level	<ul style="list-style-type: none"> Rice provides a new enterprise option <ul style="list-style-type: none"> Enterprise switch from particularly from soybeans to rice Previously underutilised land brought back into production 	<ul style="list-style-type: none"> The benefit of number of hectares planted by improvement in gross margins for rice compared to <ul style="list-style-type: none"> soybeans grazing/uncropped land. Resulting in higher incomes for participating growers – with flow-on to the region.
Drying, storage and milling	<ul style="list-style-type: none"> Increased ability to attract additional production and increase utilisation of existing capital Higher returns to milling and marketing 	<ul style="list-style-type: none"> Increased profitability in milling and marketing Further investment and employment in line with expansion

Source: CIE.

Farm level

Riverina/Murray region

Table 5.4 shows the likely farm level impacts are reasonably straightforward for the Riverina/Murray breakaway group — where an increase in revenue from paddy production is expected to flow through to farm revenue and incomes.

Our understanding is that these producers are unlikely to change their enterprise configuration significantly as they are already committed to growing rice and are constrained by their enterprise mix, rotation requirements and water allocation.

As part of the development of scenarios in appendix F, it was indicated that given sustained access to more markets, the number of growers in this group could double.

For the headline scenario, compared to baseline, farm revenue of this group is expected to increase by \$15.1 million, comprised of a combination of higher paddy prices and by the addition of land. This is roughly 1.1 per cent of the total value of output for agriculture in the region which was valued at \$1.3 billion. ⁴⁴

⁴⁴ Estimates of total output for 2019-20 sourced from REMPLAN, where the Riverina/Murray region is defined as the sum of Tocumwal - Finley – Jerilderie, Griffith region, Hay, Leeton. Deniliquin Region/Murray River.

The impact on other ricegrowers is somewhat uncertain given flow-on effects will be through changes in the paddy pricing policy by the existing supply chain. There are two broad alternatives:

- the loss of throughput could increase costs, as a result of lower utilisation of capital, and be passed on to ricegrowers through a lower paddy price
 - The extent of this reduction is uncertain as, as the loss of throughput will be minor compared to historical variations in paddy production and would difficult to separate from other decisions to invest in new infrastructure or to manage corporate costs.
 - Noting that negative changes in paddy price will reduce the ability to compete for water with the breakaway group and other irrigation-based enterprises.
- alternatively, the more effective response would be to match paddy prices to maintain long term competitiveness of the supply chain, both relative to other buyers and for rice as a crop relative to other water-using enterprises.

Given that all broadacre farms are multi-enterprise, the number of business-owners is unlikely to change relative to the normal consolidation of farms and businesses in the baseline.

Farm-level decisions are focused on enterprise mix that maximises the return from an allocation of the gross margin on a per megalitre basis. If growers are receiving better returns elsewhere in other activities, they can move away to other enterprises. Either way, it would be expected that farmers in the region to be better off.

Northern Rivers

As noted in this evaluation, the option to grow rice for many farmers in mixed enterprises is an opportunity to increase average returns by diversifying their income base and to use land that may otherwise lie vacant during heavy rainfall periods.

At farm level, a reasonable expectation is that there would be no change in employment or owner-managers as a result of each option. The outcome that would be expected are higher, and possibly more stable incomes for those businesses that engage in ricegrowing that result in marginal changes to the current crop configuration.

As listed in table 5.4, the principle impact of deregulation scenario would be an increase in gross margins relative to the current enterprise mix. Table 5.5 shows that the gross margins for paddy are considerably higher than for soybeans — between 2 and 5 times, depending on the yield and price combination. To put this in perspective, for land that is not cropped, the livestock gross margin was \$67.20 per hectare in 2019 — however livestock prices have increased considerably since that calculation and could have increased to \$90 per hectare now. ⁴⁵

⁴⁵ NSW DPI gross margin for Coastal Weaners on unimproved pastures based on an enterprise unit of 100 cows as of April 2019.

5.5 Gross margins for the Northern Rivers

		Paddy			
		Soybeans	Low	Medium	High
Long term average yield	t/ha	1.85	4.5 ^a	4.5 ^a	7.0 ^b
Price received	\$/t	600	400	450	450
Revenue	\$/ha	1 110	1 800	2 025	3 150
Variable costs	\$/ha	750	950	950	1 341
Gross margins	\$/ha	360	850	1 075	1 809

^a Long term average yield. ^b 2020 yield.

Source: NSW DPI, Aither (2018) and Natural Rice Co.

To illustrate the impact from the headline analysis, table 5.6 calculates the improvement to income in the region by assuming for the headline analysis, that of the additional 4 000 hectares planted, 90 per cent would be transferred from soybeans and conservatively, 10 per cent from grazing — which currently includes land that is unused for cropping because of waterlogging.

The improvement in the grow margin is calculated for the ‘medium’ gross margin outcome in table 5.6 — a total of \$3.33 million or \$95 000 per farm compared to the baseline. Given that the estimated of land that is currently uncropped is conservative, these estimates would provide a minimum of the benefits available.

To put this in perspective, the total value of agricultural output for the Northern Rivers region was just over \$1 billion and value-added was \$479 million in 2019-20.⁴⁶

5.6 Impact of farm revenue in the Northern Rivers for the headline analysis

	Change in rice planting from baseline	Improvement in gross margin ^a	Improvement in farm income
	ha	\$/ha	\$m
Total land planted	4 500	742	3.339
— from soybeans	4 050	715	2.896
— from grazing	450	985	0.443

^a Using the medium gross margin for rice in table 5.5.

Source: Table 5.6 and CIE calculations.

It would be expected that there would be little or no change in employment at farm level as a direct result of reforming domestic rice arrangements and the rice vesting requirements. At minimum, there would be no loss of employment at farm level or, more likely, a small increase in jobs especially for seasonal or part time work during times of the year that are outside harvest periods for other crops.

The switch from lower gross margin activities and benefits to current cropping rotations would result in an overall increase in farm productivity in the region.

⁴⁶ Estimates of total output for 2019-20 sourced from REMPLAN, where the Northern Rivers is defined as the sum of Ballina, Casino, Kyogle and Lismore regions.

Drying, storage and milling

Riverina/Murray region

Indications from the Riverina/Murray breakaway group suggest that investment in infrastructure will be required on-farm and then moving off-farm where centralised facilities in drying, storage and milling will be located.

- Initially, in the first two years this investment would be in the order of \$5 million and over 6 years this would be expected to increase to a total of between \$20 to \$25 million — which also includes investments in packaging and marketing.
 - This reflects the scalable nature of these types of investments based on current storage, auger and drying technology and the productivity and efficiency of these technology is significantly better than that was available even 5 years ago.
- The design and function of these facilities have been planned around similar investments made in corn storage by grain traders in the region.

Box 5.7 outlines an approach to understand the regional impacts of changes in investment across rice supply chains.

5.7 Regional impacts of additional investment

The flow-on impacts of regional investment largely depend on the regional content of the construction and machinery equipment costs. To provide an estimate of these flow-on effects, a detailed breakdown of these costs would be required.

- Silos, particularly those that have been built or modified for air-drying, augers and sheds are likely to be sourced from within the region or adjacent regions — based on the extensive size of the grains industry in the region.
 - Site development including site levelling, concreting and shed fabrication would most likely be local.
- Specialist equipment for rice including milling and colour-sorting machines is available from domestic manufactures/distributors — but this equipment is largely imported. For example, a business located in Penrith that also provides capital equipment and maintenance to SunRice.⁴⁷
- Another option identified during the consultation was to import a cost-effective rice mill and equipment directly from either Vietnam or China.

That is, a large proportion of the investment in a region would be reasonably expected to leave the region, but locally purchased labour and goods and services would be an important contributor.

For the Riverina/Murray group, it is anticipated that investments will require a mixture of full and part time employment depending on the season. It is envisaged that in 6-years

⁴⁷ <https://www.satake.com.au/about-us/>

time, employment will be between around 20 full time equivalents which includes packaging and marketing operations.

Across these regions, total employment in agriculture and manufacturing was around 3 750 and 11 743 persons across the Riverina/Murray region — although its important note that these are variable with economic conditions. ⁴⁸

Riverina/Murray region

Recent trends in box 5.8 do show that there has been a decline in employment of the milling sector in the region in recent years, as a result of longer-term trends towards declining rice production in the region and due to corporate efficiency measures.

From the consultation, around 60 per cent of the total paddy moving to the new supply chain would otherwise have been send to the Deniliquin mill and the remaining 40 per cent processed by the Leeton mill. The reduction in the use of AGS storage facilities would be in similar proportions between these regions.

Based on the headline analysis, as a result of full deregulation, total paddy diverted from the supply chain could be 50 kt in a ‘normal’ production — of which 30 kt and 20 kt would be processed at the Deniliquin and Leeton mills. The 50 kt is small compared to:

- variations in paddy production that have occurred over the past 10 years
- the rated capacity of both mills of 800 kt — noting that both milling and storage have been underutilised for some time against their rated capacities.

One outcome could be that employment, in terms of number of jobs, is transferred from one supply chain to another. However, given that overall production in the region is expected to increase, there should be an overall small increase in employment, with possibility of some reallocation of jobs as the industry adjusts.

At a regional level, it would be expected there would be modest changes — given that agriculture and early-stage processing contributes 16 per cent of total employment.

Northern Rivers

In terms of the Northern Rivers regions, we note that a series of investments have been made or are underway in drying and storage infrastructure — however the value of these investments in not known. In 2018, Natural Rice Co acquired a site at Kyogle to dry, store and distribute paddy. This is addition to on-farm drying and storage capacity that is already in place held by licenced domestic buyers.

- All rice is currently milled at the Slater Farms facility. It is not known if Natural Food Co is planning another milling facility in the region.

⁴⁸ Estimates of total employment for 2016 sourced from REMPLAN, where the Riverina/Murray region is defined as the sum of Tocumwal - Finley – Jerilderie, Griffith region, Hay, Leeton. Deniliquin Region/Murray River

5.8 Variability in employment a characteristic of the Riverina/Murray rice industry

2008: During the Millennium drought the Deniliquin mill shut and reopened three years later with re-employment of staff.

2016: SunRice revamped milling programs and 50 jobs were lost. The Deniliquin plant reduced the current two mills operating on five-day, 24-hour shift patterns to one mill remaining on its existing hours and the other to be cut back to a five-day, eight-hour shift.

2018: Since November 2018 there has been a reduction in the SunRice mill workforce of 132 jobs employees.

- November 2018. SunRice indicates while its continued employment is around 500 persons in the Riverina, it announces a reduction in its workforce in its Deniliquin and Leeton mills of 100 jobs.⁴⁹
 - The 24-hour running time at Deniliquin’s Mill Two dropped to five days a week next month, and Mill One to wound back to 16 hours, five days a week on January 31, then stop operating in April 2019.
- July 2019. The Deniliquin mill was operating 40 hours a week. At Leeton, the plant will reduce its around-the-clock operation from seven days to five days in April.
- October 2019. As a result of low throughput, SunRice announces the loss of 32 FTE positions across the Leeton and Deniliquin mills and the Australian Grain Storage facilities.⁵⁰
 - SunRice took key decisions to maintain milling capacity at its Deniliquin and Leeton mills through 2020. This was based on costs of re-opening mills.
- November 2019. A subsequent news article reported that total job losses were 230 since November 2018 with a reduction of another 100 jobs made up of: 55 at the Leeton mill, 25 at the Deniliquin mill, 20 at the Australian Grain Storage facilities.⁵¹

- Estimates of the value recent/prospective investments by the supply chain were not made available to this evaluation however it is expected that they are in the order of \$10 million.

Our understanding is that small to medium scale facilities are not labour intensive, and that part-time labour is hired as-required during peak operational times such as during harvest. In some cases, a number of the operations required are automated (such as drying) and can be managed by the business-owner without the requirement of additional hired labour.

⁴⁹ <https://www.abc.net.au/news/rural/2018-11-30/sunrice-axes-100-jobs-at-deniliquin-and-leeton-mills/10571666>

⁵⁰ <https://www.abc.net.au/news/2019-10-02/low-rice-crop-leads-to-sunrice-job-losses/11566748>

⁵¹ <https://www.abc.net.au/news/2019-11-26/100-more-jobs-to-go-at-sunrice/11739704>

Based on our understanding of supply chains of similar sizes, we expect that the additional employment would be around 10-15 full time equivalents, located in the region, for the headline analysis. This recognises that Natural Rice Co has its offices in Penrith and that some operations, such as packaging from bags, are currently out-sourced in Sydney.

Conclusions of cost-benefit analysis

Table 5.9 summarises the key findings and conclusions.

5.9 Key findings of the evaluation

Question	Conclusion
Do the benefits of rice vesting outweigh the costs to the community as a whole?	<ul style="list-style-type: none"> ■ No. A key finding of this report was that the current export single desk does not result in export prices above those that could be reasonably expected in the case without a single desk. ■ The current regulatory framework restricts the ability for new supply chains to compete effectively in potential markets. This is especially in the case, where exports provide the option for these new players to diversify their sales and manage market risks. ■ In absence of these restrictions, the most likely outcome would be that the existing supply chain continues to operate as business-as-usual albeit at lower throughput levels while new supply chains emerge to take advantage of new domestic and export opportunities. ■ The benefits to individual businesses are likely to be substantial and the flow-on benefits to regional NSW are clearly positive compared to those for export single desk – especially for regions that cannot currently export and are restricted to the domestic market.
Are any net benefits (or the majority of these benefits) derived as a result of rice vesting alone?	<ul style="list-style-type: none"> ■ The objective of rice vesting by the RMB is to enable the operation of the export single desk and the generation of export premiums relative to the case of a competitive markets. ■ A finding of this report is that observed export price premiums are not the result of the market power but from a differentiated product approach that is based on a branding strategy, targeting niche markets, and providing year-round product to customers. ■ The holder of export single desk is a small player by global standards and operates in niche market in an increasingly sophisticated global market. ■ In a deregulated market, there is little chance that the NSW rice industry would resort to a large number of independent supply chain or a Californian-style industry where there are 3 large corporate players.
In the absence of rice vesting, would a viable rice export market continue to provide benefits for NSW rice growers?	<ul style="list-style-type: none"> ■ Yes. Without vesting and a single export desk, new supply chains in the market would be able to develop new markets and products with minimal impact on established supply chains.

Source: CIE.

A Profile of NSW rice exports

NSW rice over the past 10 years has been exported to around 60 different countries. This profile has been simplified to cover the major volume and value contributors to total exports of milled rice. Table A.1 provides the mapping of the major groupings to individual export markets identified by data supplied by Customs/Australia Border Force (ABF).

A.1 Countries of SunRice export market groupings

SunRice grouping	Export markets
Pacific Majors	Papua New Guinea Solomon Islands
Middle East	Saudi Arabia Jordan Israel Kuwait Qatar United Arab Emirates Lebanon Other Middle East – (Bahrain, Egypt, Iraq, Iran, Oman, Palestine, Syria, Yemen)
WTO	Japan Korea Taiwan
New Zealand	New Zealand
Pacific Islands	Fiji New Caledonia Micronesia Kiribati Marshall Islands Vanuatu Samoa Other Pacific Islands – (Nauru, French Polynesia, Palau, Tonga, Tuvalu, Wallis and Futuna)
Other countries	Hong Kong, Singapore, Thailand, United States, Canada, all other countries.

Source: CIE.

Key export markets

Over the past 10 years, in line with the developments on the Riverina/Murray supply side, there has been a significant shift in the profile of individual export markets serviced as shown in chart A.2. The corresponding export returns from these markets are shown in chart A.3 on a fob basis.

A.2 SunRice export volumes by export market groupings^a

REDACTED

^a Shipped weight. Note the same scale across groupings to enable comparison. Only the primary Middle Eastern markers identified.
Data source: ABF (Customs) data.

Papua New Guinea

To 2014-15, PNG was the largest single export destination — where bulk rice was exported to the SunRice subsidiary Trukai Industries facility in Lae for packaging. From 2015-16 onward, Australian product was replaced principally with lower cost product from China as a result of higher NSW rice prices, the declining value of the Kina against US and Australian dollars and an overall deterioration in the PNG economy resulting in a lower capacity to pay.

- It is noted that rice sold in PNG requires vitamin enrichment, which along with its local presence, provides NSW rice with a significant market dominance.
- With continued deterioration in the Kina and the decline in economic activity worsened by Covid, this situation is unlikely to change for the foreseeable future.

A.3 SunRice export returns by market grouping^a

REDACTED

Data source: ABF (Customs) data.

Solomon Islands

SunRice also has a subsidiary in the Solomon Islands. Unlike PNG, the majority of NSW rice is exported in bags between 5 and 20 kilograms, packed in Australia and marketed under the SolRice brand.

- Historical exports to this market are largely a function of SunRice production levels falling close to zero during the 2016-17 and 2020-21 crop years.
- This opened the way for increased competition, particularly from branded Wilmar product sourced from Vietnam, and recently has been replaced by low-cost product sourced from China.
- In the baseline, SunRice exports should resume due its branding targeted at the Australian ex-pat community, albeit at lower levels similar to those in the last ‘reasonable’ production year.

Jordan

Up until 2014-15, rice was exported bulk to its Jordan plant for packaging. Following the strategy to move to branded product, and the current uncertain policy environment within Jordan, SunRice is unlikely to export bulk product to their Jordan packing plant.

- Recently, the United States has increased market share in Jordan at the expense of NSW product, although reduced availability has been a significant factor.

- Currently Jordan is under Marshall law and in a difficult economic position with stagnant economic growth, significant political uncertainty and restrictions on food placed under emergency powers.
- Given a strategy to hold price points, market share is unlikely to recover in the baseline.

Israel

Israel has been a consistent and premium market for SunRice up until the 2020-21 crop year when there were little NSW product and when US exports filled the shortfall.

- In 2016-17, Israel was one of the few Middle East markets that was supplied by NSW rice while exports to other countries in the region fell.
- With brand presence, there should be scope to regain market share given sufficient export volumes. This is especially the case in the 2021 crop year where drought conditions in the Californian industry, and improved supply in the Riverina, would result in a switch of market share that occurred in 2021.

Lebanon

This was previously a market with significant promise for NSW rice based on the positioning of medium grain rice (for Levant foods) and a substantial ex-pat Australian community.

- However, this market has shifted against Australian product as local economic performance and consumer confidence has plummeted, especially following the Beirut harbour explosion.
- Lebanon now has access to cheaper Egyptian medium-grained rice at a substantial discount to both Australia and US product, as a result of the removal of export restrictions in Egypt,
- Over the next 5 years, Lebanon is unlikely to be a priority market despite efforts to develop it.

Saudi Arabia

Saudi Arabia is viewed as premium market by all rice exporters, not just the NSW industry, and it is directly targeted through its SunWhite brands but also its secondary brands using product sourced from other countries.

- Basmati supplied by India comprises 80 per cent of the Saudi market. The United States is also a major player in the medium grain segment — the majority of this product is exported bulk for packing or bagging locally.
 - Californian rice sold under the Abu Bint and owned by America Rice Inc is a direct competitor to NSW product.
- Export returns for NSW from the Saudi Arabia is substantially higher than for other countries in the region. There would be no reason why, NSW rice could not re-enter

this market as previous levels based on the maintenance of the market presence through their use of secondary brands using imported product.

WTO markets

Japan, Korea and Taiwan are so-called tender markets that have been dominated by US bulk rice (which is stored locally). These import markets are dominated by government regulation and is largely restricted to rice used for manufacturing or stockfeed.

- Given the move to a premium branding strategy from 2014 onward, and the lack of product to service premium markets, NSW has not consistently targeted these markets, but when returns are sufficiently high to justify the sale.
- With Californian rice production reduced in the 2021 crop year due to drought, there could be an opportunity for NSW rice if prices were sufficient high enough to cover exporting and freight costs.
- The agreement under CPTPP gives Australia a new 6 000 metric ton rice quota into Japan and will be imported using the simultaneous-buy-sell (SBS) mechanism that is currently used to import table rice for commercial channels.
 - After three years, the quota increases annually, reaching 8 400 metric tons by 2030.⁵²
- The other avenue to the Japanese market is through the Minimum Access (MA) tender system which is dominated by Californian suppliers.

New Zealand

Outside of the domestic market, New Zealand is the most reliable/stable market realising above-average export returns. Export volumes declined in 2020-21 as a result of a poor crop year and lower rice stocks in the Riverina.

- NSW rice services three distinct segments: retail, food service and food ingredients. All segments have tended to move together in volume terms.
- Certainly, in the baseline, this market would be a priority.
- In a different finding to previous work, analysis of trade data showed that NSW and US rice have similar freight costs in US dollar terms — based on New Zealand trade value on a CIF and FOB basis.

Pacific Islands

Similar to PNG and the Solomon Islands, the remainder of the Pacific have been a traditional market for NSW rice based on a strong history of export and supply.

- In line with their corporate strategy and availability of product, SunRice has stopped exporting continuously to this region since the 2015-16 crop year.
- New Caledonia was a bulk market with the remaining markets focused on large-bagged product the same as the Solomon Islands. This market has also been targeted

⁵² <https://agfax.com/2019/01/15/rice-japan-gives-australia-new-quota-u-s-need/>

by Wilmar with principally Vietnamese and Thai rice that partially filled the gap left when the availability of NSW rice fell.

- It would be expected that with greater product volumes and established distributor networks, exports would be re-established at levels lower than 2015-16.

Export format

As noted in the market analysis, export format is crucial link to the characteristics of the market and prices received. Chart A.4 shows how NSW product has moved away from bulk exports (towards packaged and bagged product which enable greater branding).

In practice, NSW rice is exported in around in 30 different packaging formats or combinations that are tailored to specific markets — which have been simplified for presentation. The key assumption would be that packs and bags under 25 kilograms would predominantly retail focused whereas bags 25 kilograms and over would target food service and may be repacked (if the product was unbranded).

A.4 NSW rice export of bulk rice to key markets^a

REDACTED

^a Bulk rice is defined to include 25 kg bags and above including unpackaged rice in containers.

Data source: ABF (Customs) data.

Across all markets, the average export returns increases with the degree of packaging as shown in chart A.5. Average return from rice in packs under 10 kilograms has been significantly higher than for packs or bags between 10 and 25 kilograms on a per kilogram basis for the period

A.5 SunRice export volumes and returns by package size

REDACTED

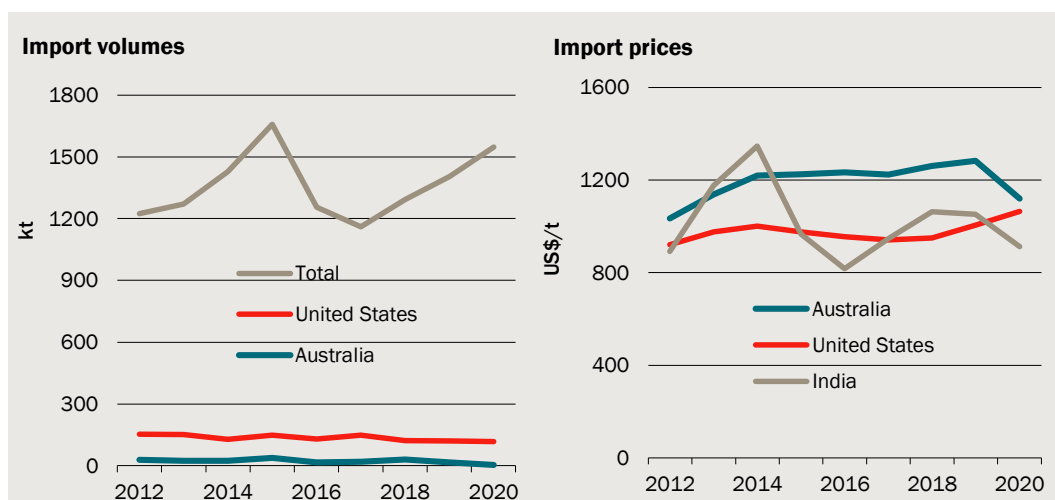
Data source: ABF (Customs) data.

Between 2015-16 and 2020-21 the average differential based on packaging was significant. [REDACTED].

Case study on Middle East markets

Saudi Arabia is the largest single rice market that is serviced by the NSW rice industry in terms of overall size as shown in the first panel of chart A.6. Over the past 9 years, Australia accounted for around 2 per cent of the total market.

A.6 Rice exporters to Saudi Arabia



Data source: UN Comtrade database.

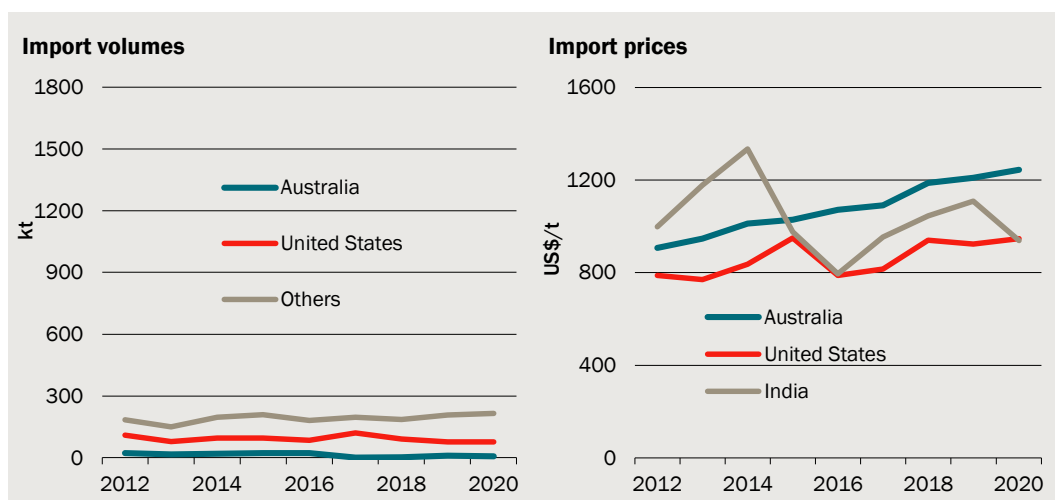
In terms of prices landed in-market, NSW rice has received a consistent differential over US product of around 20 per cent of \$US215 per tonne.⁵³ A significant proportion of this differential can be attributed to the fact that the majority of US product is delivered in bulk for storage and packing in the region.

Jordan, as shown in chart A.7. is a significantly smaller market than Saudi Arabia which has the United States as the dominant supply with a 50 per cent market share. In recent years, shortage of NSW product has reduced market share.

- Over time, the NSW price has rising in line with high-costs of production and the switch from bulk to packaged product.
- In terms of price differential with the United States, they are similar to those for Saudi Arabia. NSW import prices sourced from UN Comtrade are US\$215 higher or 25 per cent than the US prices — attributable to the fact that the majority of US product is landed in-bulk.

⁵³ UN Comtrade data.

A.7 Rice exporters to Jordan



Data source: UN Comtrade database.

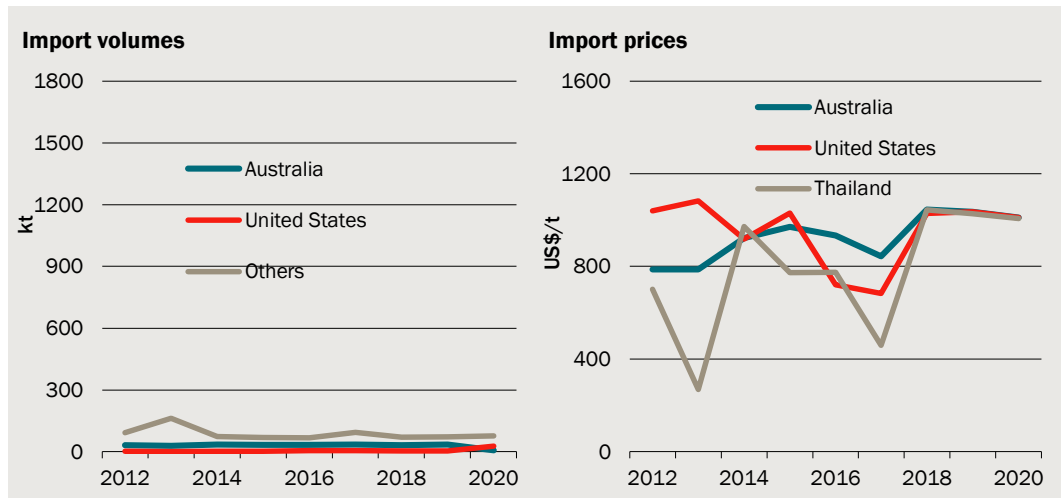
Australian and Thailand have been the dominant suppliers to Israel — with NSW rice having an average 30 per cent export share (chart A.8). Despite falling production volumes. This market was continuously supplied up until 20120 when rice stocks were depleted in the Riverina/Murray region.

Over this period, NSW rice has been landed at a price that was, on average similar to US product but had a significant differential to Thai rice. However, the UN Comtrade data indicates that reported prices of ethe suppliers have converged around US\$ 1 000 per tonne, which is highly unlikely as Australian export data indicated export fob value of [REDACTED] plus the additional costs of freight and other margins.

Lebanon is a small but growing market that has overtaken Israel in terms of total import volumes growing to 125 kt in 2020 compared to 77 kt in the case of Israel (see chart A.9). The entry of lower-cost medium-grain rice from Egypt has had an impact on both NSW and US exporters.

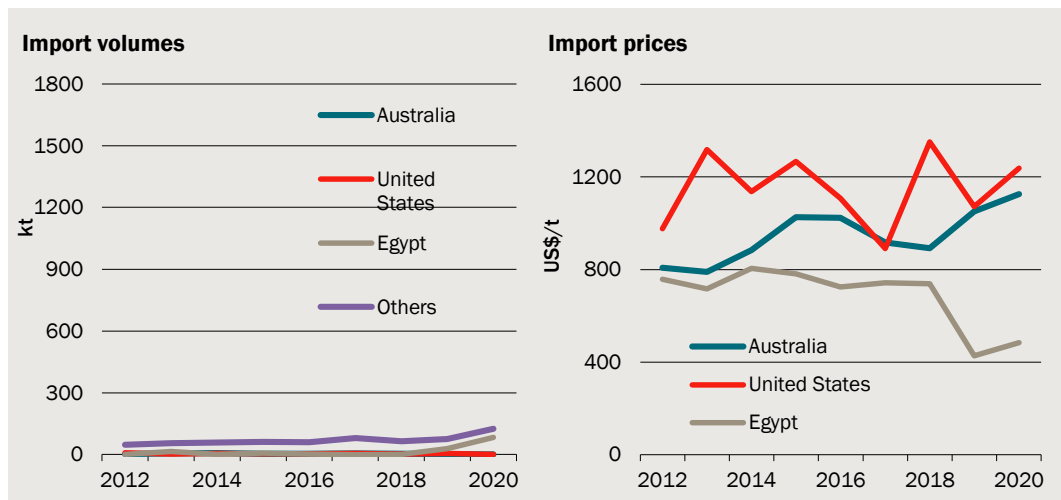
While the Middle East is identified as a premium market for rice, each of the markets is quite different and also dynamic in terms of competition from other suppliers.

A.8 Rice exporters to Israel



Data source: UN Comtrade database

A.9 Rice exporters to Lebanon



Data source: UN Comtrade database.

B SunRice a multinational food company

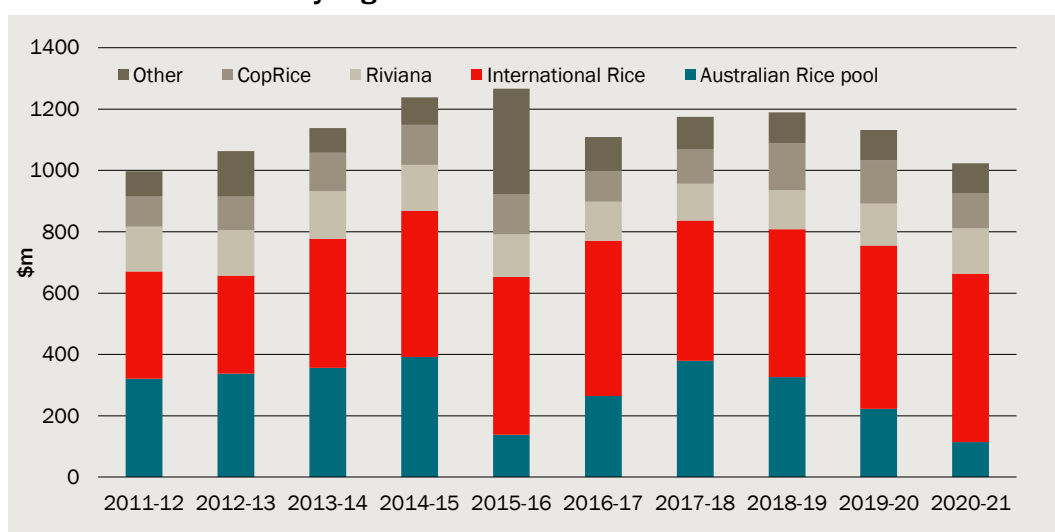
Like the other multinational business in the global rice market, SunRice has successfully diversified its revenue base and followed a branding strategy.

A large and diversified business

SunRice is a multinational, integrated and diversified business with a billion dollar revenue base as shown in chart B.1 that operates across the following segments:

- Rice Growers Pool. The milling, marketing and distribution of Riverina rice to consumers through intermediaries and direct to food service and processing customers based on strong branding and market positioning.
- International Rice. The marketing and distribution of rice from non-Australian sources based on the same marketing approach for Australian rice. That is, a global sourcing strategy.
- Riviana Foods. The importation, manufacture and distribution and sales of consumer food products for retail in Australia — based on branding and product development.
- CopRice. The manufacture and sale of pet and stockfeeds to consumers and primary producers based on rice coproducts.
- Other including Rice Foods: the manufacture, marketing and distribution of value-added rice-based products including rice-cakes, rice flour and microwave ready meal solutions made from local and imported rice input.

B.1 SunRice revenue by segment^a



^a External revenue by SunRice segments. Other includes Rice Food, Australian Grain Storage and corporate transfers.

Data source: SunRice Annual Reports, various years

Consistent with downwards trending production in the Riverina identified in chapter 2, the contribution by the Australian or Growers Rice Pool has declined since 2011-12 as shown in chart B.2

As a result of constraints on Riverina rice production, SunRice restructured its core rice businesses towards the International Rice that includes:

- importation of rice into Australia
- sourcing foreign rice for its business segments in PNG and Solomon Islands (now based on Chinese rice) and exports to the Middle East (when Australian rice is short).

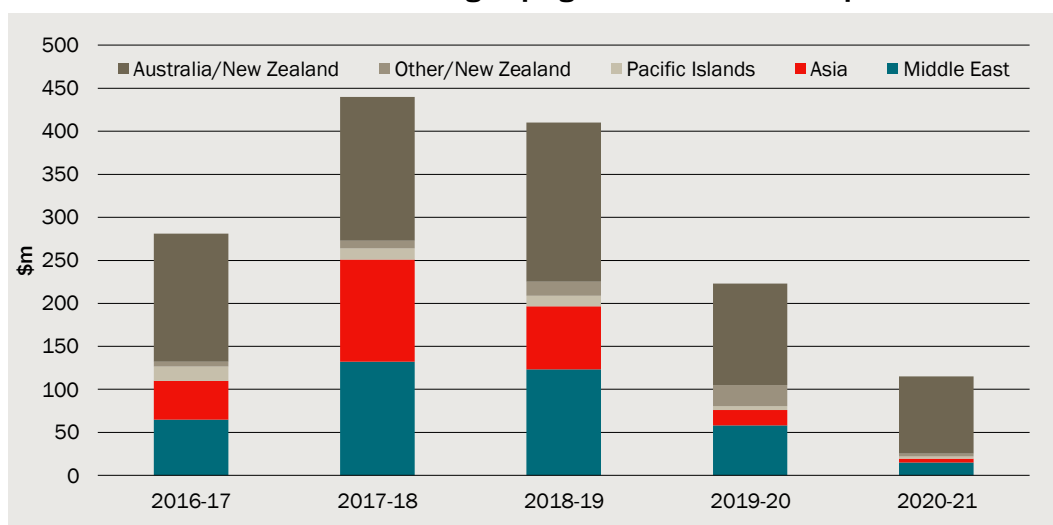
Prior to 2016-17, revenue from the Australian rice pool comprised between 50 and 60 per cent of both segments. With the declining availability of Riverina rice, revenue from the Australian rice pool steadily declined to less than 20 per cent of their total revenue from rice sales in 2020-21.

As part of this transition, SunRice acquired the rice milling assets of the Blue Ribbon Rice Group in the Burdekin region of North Queensland in 2014-15. As part of its diversification strategy, SunRice purchased milling capacity in California — the Woodlands mill and through its subsidiary SunFoods, sources rice from the Central Valley RiceGrowers Association which is packed into branded products for sale to customers in existing and new markets.

In terms of revenue by market from the SunRice Annual report, chart B.2 shows the significance of each of the market groupings — as production volumes declined, the use of Australian rice retracted to the domestic market.

By 2020-21, the domestic and New Zealand markets contributed 69 per cent to rice pool revenue, compared to 38 per cent in 2017-18 when greater rice availability enabled exports to both the Middle East and Asia.

B.2 Revenue from SunRice market groupings for the Growers rice pool^a



^a External revenue by SunRice segments. From 2016-17 to 2018-19, SunRice reported on a total revenue basis, not external revenue. For these years, total revenue by market was scaled to equal the reported external revenue for the Australia rice pool.

Data source: SunRice Annual Reports, various years.

Branding an important part of the SunRice strategy

A large part of the SunRice corporate strategy, has been the increased use of branding which SunRice signalled in the 2015 Annual Report and the move to higher value sales as part of an integrated approach to diversify and maximise its returns from Australian-grown rice.

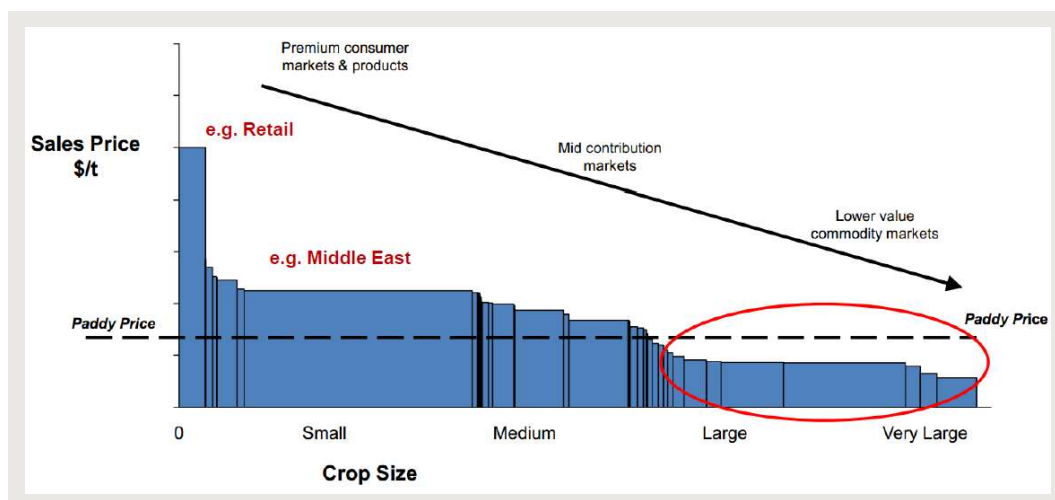
Over the past 12 months, SunRice continued to deliberately transition from bulk to branded sales in key global markets. This has been a central element in our strategy to grow branded markets off-shore and create demand for a crop larger than we can consistently supply from our Australian base.

The core of this strategy is recognition that SunRice cannot compete in the commodity or mid-commodity space and has moved to a higher cost approach based on product differentiation, branding and product positioning.

Over the period 2011-12 to 2014-15, SunRice reported growth driven by branding that was constrained by supply: over this period sales volume of branded price increased by 42 per cent.⁵⁴ In essence, branding is used to position a product in a price point range that is on a consumer segment that is different to direct competitors. Other components to the strategy to maintaining or increasing demand include consumer promotions — communication to consumers about the quality, the clean-and-green image and how information on how the product can be used in meal solutions and special occasions.

Chart B.3 shows SunRice's strategy from 2015, and how market composition changes with crop size — that is, as crop size falls, sales retract to focus on premium markets.

B.3 SunRice depends on crop size



Data source: https://investors.sunrice.com.au/FormBuilder/_Resource/_module/2weQNICYSUy13FE_jxQXvg/file/nsxannouncements/2015/09/230915-sunrice-shareholder-workshop-presentation_sept-15-final_for-distribution.pdf

⁵⁴ https://investors.sunrice.com.au/FormBuilder/_Resource/_module/2weQNICYSUy13FE_jxQXvg/file/nsxannouncements/2015/09/230915-sunrice-shareholder-workshop-presentation_sept-15-final_for-distribution.pdf

C Details of consultation process

Summary of consultation process for this evaluation

Table C.1 provides a detailed list of those that were consulted for this evaluation.

C.1 Stakeholders consulted ^a

	Rice stakeholders	Location	CIE Team
15 June	DPI/PC meeting with Rice Marketing Board	Teams	Derek Quirke (VC) Peter Woods (VC)
Riverina Industry			
25 June	DPI/PC committee with Rice Growers Association	Teams	Derek Quirke (VC) Peter Woods (VC)
28 June	RGA suppliers workshop	Wagga	Peter Woods (in person) Derek Quirke (in person)
29 June	RGA suppliers workshop	Deniliquin	Peter Woods (in person) Derek Quirke (in person)
29 June	Scott Barlow Executive General Manager Customer Relations Murray Irrigation	Deniliquin	Peter Woods (in person) Derek Quirke (in person)
29 June	Jenny McLeod Ricegrower and Coleambally Irrigation, Policy & Communications Manager	Deniliquin	Peter Woods (in person)
30 June	RGA suppliers workshop	Leeton	Peter Woods (in person) Derek Quirke (in person)
6 July	RGA Board meeting	Teams	Derek Quirke (VC) Peter Woods (VC)
6 July	Alison Bowman Group Director, Plant Systems Australian Rice Partnership	Wagga Wagga	Peter Woods (phone)
12 July	RGA growers workshop	Griffith	Peter Woods (in person) Derek Quirke (VC)
13 July	RGA growers workshop	Leeton	Peter Woods (in person) Derek Quirke (VC)
13-July to 3-Aug	10 Ricegrowers, some are also licenced buyers	Number of locations	Peter Woods (in person and via phone)
13 July	RGA growers workshop	Coleambally	Peter Woods (in person)
14 July	RGA growers workshop	Deniliquin	Peter Woods (in person) Derek Quirke (VC)
14 July	RGA growers workshop	Finley	Peter Woods (in person)
3 August	GrainCorp Licensed Buyer	Sydney	Peter Woods (phone)
3 August	Ho Hang Goulburn Enterprises, Licensed Buyer	Narre Warren	Peter Woods (phone)

	Rice stakeholders	Location	CIE Team
5-Oct	Mirza Kozarcenin, A.I. LAMB Pty Ltd		Derek Quirke (Teams)
Northern Rivers industry including the Burdekin			
22 June	Mitchell and Nelson Green Natural Rice Co. Rice buyer, marketer and retailer	Penrith	Peter Woods (in person)
23-27 June	6 Ricegrowers, some were also licensed buyers	Burdekin and Northern Rivers	Peter Woods (in-person and by phone)
27 July	DPI growers meeting with NRRGA	Lismore	Peter Woods (in person) Derek Quirke (VC)
SunRice			
2 July	DPI/PC meeting <ul style="list-style-type: none"> ▪ Rob Gordon (CEO) SunRice ▪ Julian Luke SunRice 	Teams	Peter Woods (VC) Derek Quirke (VC)
29 July	Follow-up DPI/PC meeting <ul style="list-style-type: none"> ▪ Rob Gordon (CEO) SunRice ▪ Julian Luke SunRice ▪ Tom Howard SunRice ▪ Justin Bond SunRice 	Teams	Peter Woods (VC) Derek Quirke (VC)

^a DPI/PC meetings were attended by both the DPI Rice Vesting team but also those from the NSW Productivity Commission. All other RGA workshops were attended by the DPI Rice Vesting team.

Source: CIE.

Key outcomes of formal consultation opportunities

Formal opportunities include events organised by either the RMB, RGA or the NRRGA that involved the participation of the NSW DPI Rice vesting (DPI) team and the NSW Productivity Commission (PC) teams.

RMB meeting

This meeting was arranged to introduce the DPI, the PC and the CIE as the economic consultants as part of the overall DPI rice vesting review.

- DPI outlined the structure and the process of the review included a call for submissions from the industry.
- The RMB Chair outlined the case for renewal of the single desk arrangements.
- The meeting provided the context for following meetings with the RGA and SunRice Board Members and executives. SunRice and RMB share board 2 members (out of 7 representatives on the RMB)

RGA suppliers' workshops

These workshops were organised by the RGA primarily to garner support from stakeholders outside of farm-level ricegrowers.

- These businesses primarily included input suppliers and transport operators for SunRice. The material presented was prepared by SunRice and delivered by a SunRice Board Member with at least 1 other SunRice Director in attendance.
- The focus of the presentations was the importance of the export single desk in maintaining SunRice's contribution to the regional economy.
- The DPI presentation centred around the mechanics of the review and their call for submissions.
- There were few questions raised at these meetings as many of the attendees were not directly involved in the key issues of vesting or the single desk.

RGA growers' workshops

These meetings were also organised by RGA but for the primary purpose of conducting their Annual General Meeting. An agenda item was the DPI presentation on rice vesting.

- The RGA material presented was identical to the suppliers workshops and was delivered by a SunRice Board member with at minimum another board member in attendance in-person or via video conference. On 2 occasions, the SunRice Chairman attended and spoke at the meetings.
- From a consultation point-of-view, this series of meetings presented a better opportunity to approach growers for their views on the single desk.
- Again, there were few questions raised at these events as ricegrowers were either strongly in-favour of current arrangements or didn't want to be publicly identified.

NRRGA meeting

This meeting with northern industry stakeholders focused exclusively on the DPI review. There were no representatives of southern industry or the RMB present, but it did include the owner of Natural Rice Co.

- A consistent theme of the questions was around the DPI role in the review process and how this process would differ from the previous review in 2016.
- Ultimately, these stakeholders wanted to be excluded from the current arrangements based on the geographical separation with the southern industry and their desire to operate independently of the RMB or SunRice.
- Compared to the RGA meetings, there were a number of speakers and questions from the floor who supported this view.

SunRice

As the holder of the Sole and Exclusive Export Licence, SunRice is a key stakeholder.

- SunRice is now a large and diversified company having moved from a grower cooperative to listing on the ASX has which appears to have changed the objectives and focus of SunRice.

- A large component of these meetings centred around access to data particularly the detailed verification reports for the two major benefit areas claimed by SunRice: export price premiums and freight scale advantage.
 - These reports have been prepared by Grant Thornton Australia (GTA) and more recently Syneca Consulting Pty Ltd for the *RMB Annual Report to NSW Rice Growers* which are publicly available but are heavily summarised to exclude supporting details.
- A significant concern of SunRice was releasing information to the review was the likelihood of a freedom of information request ⁵⁵ made by its competitors. [REDACTED].
- In the second of these meetings, more specific questions around individual markets and trends were put to SunRice, the majority of which were answered by the CEO.
- Consistent with their Annual Reports, and a large number of communications with shareholders, branding and product positioning was identified as a large component of their marketing play. In addition, the shift from bulk to packaged products and the purchase of low-cost Chinese rice for markets in the Pacific regions was recognised.

⁵⁵ Made under NSW Legislation Government Information (Public Access) Act 2009 No 52 — commonly referred to as GIPA.

D Measuring market power

This appendix explores each of the approaches that were used to evaluate the extent of market power, and subsequent benefits, to the Riverina/Murray supply chain from the current regulatory framework.

Observation of marginal cost (or average variable costs)

One approach that has been suggested to measure market power is the Lerner Index — that is, the extent to which price exceeds marginal cost. Since marginal cost is not easy to measure empirically, an alternative is to substitute what is average variable cost.

Calculation of marginal cost for this review would have drawn on knowledge of:

- the paddy pool price (adjusted for milling yield and for byproduct credits)
- milling and packaging costs (excluding overhead and shared costs)
- stockholding costs including carryover product between years
- rail freight from Leeton to Melbourne
- port and loading charges and
- sea freight and insurance (if you are required to work back from prices received in-market).

Table 4.5 shows that while much of that data was not available, some information is available such as the revenue of the Growers rice pool and payments to growers.

Calculation of average variable costs requires:

- knowledge of key supply chain costs including milling costs and freight charges
 - While there are proxies for some costs available — for example, toll milling at around \$120 to \$140 per tonne in the current Australian market, other variable costs would be specific to tendering arrangements with suppliers.⁵⁶
 - Costs would also likely vary depending on the production configuration for each market and vary over time. The supply of product and utilisation of mill capacity year-round requires holding stocks — which is also required additional costs.
- the allocation of overheads shared between its respective profit centres for the current supply chain, particularly the Growers Pool and the International Rice business, including those for marketing and branding.⁵⁷
- carryovers of stocks, apportioned between crop years

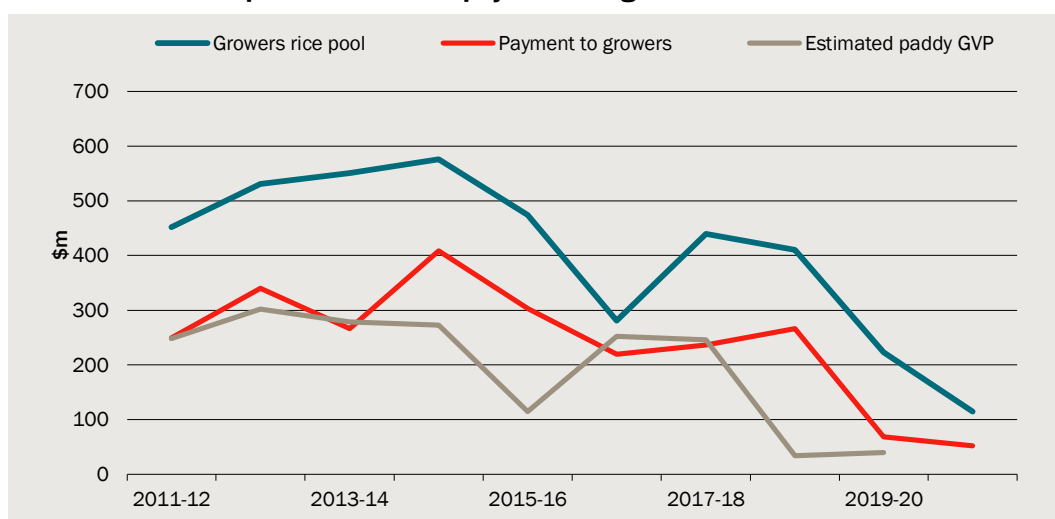
⁵⁶ This estimate was sourced from industry consultation.

⁵⁷ – Each year, using the Board’s discretion, SunRice sets a charge that is deducted from the Grower’s Pool for branding and marketing.

- variation on the pool price depending on the circumstances and the availability of paddy relative to production requirements.

In terms of payments to growers, chart D.1 shows the relationship between the revenue from the Growers' rice pool and payments to ricegrowers. Over the timeframe 2011-12 to 2020-21, payments to growers represented an average of 60 per cent of total revenues — ranging from 30.1 per cent in the 2019 crop year to 78 per cent in the 2016 crop year.

D.1 Growers rice pool revenue and payments to growers^a



^a ABARES estimated paddy gross value of production is equal to paddy production multiplied by indicator price.

Data source: SunRice Annual Reports, various years and ABARES.

Chart D.1 also shows another estimate of estimated farm-level gross value of production based on paddy production and ABARES gross unit value of production (\$ per tonne) which is based on an indicator price (the announced return for Reiziq). This shows the significance of other factors, such as carryovers between years and corporate costs, in determining the actual return received by growers.

Estimation of elasticity of demand

The traditional economic approach is to measure the residual inverse elasticity of demand facing an individual firm since it is related to the firm's price-cost (profit) margin and its ability to increase price. The inverse elasticity of demand measures the change in import price of the product in response to change in quantity — which elasticity of demand can be estimated using simple econometrics but is usually restricted by data quality.

The dynamic international market which is not limited to the Californian industry but also includes relatively recent entrants such as Egypt. Because of its importance as a staple in various cultures, the exacting requirements, and differentiated nature of rice, rice suppliers could enjoy some amount of market power. The extent of this dependent on the intensity of competition, which is reflected in the residual demand elasticity faced by each supplier. Generally, in imperfect competition, the market power of a supplier of a

commodity is expressed as the relative markup over the marginal cost of production. However, the marginal cost firms is often unknown, especially is the case of multinational firms. In some cases, the market share held by a firm is a good indicator of its market power, that is, higher the market share, the more market power it has. But even firms with significant market share can be operating in perfectly competitive market if the elasticity of demand is very high or where the product is highly substitutable. Equally, it may also be the case that firms with significantly low market share enjoy some amount of market power due to product differentiation.

Another indicator of market power that has been widely used in the context of international trade has been the inverse elasticity of residual demand. The inverse elasticity measures how much the price of a product will change if the quantity in supply changes. The higher the inverse elasticity of demand, the greater the market power of a firm, taking into account supply from other firms.

This methodology was initially developed by *Pinelopi K. Goldberg* and *Michael M. Knetter* to measure the intensity of the competition in export markets.⁵⁸

A residual demand function measures demand faced by a firm (in this case, an exporter), in a larger market, as a function of price and other factors. When presented in inverse, that is, price as a function of quantity demanded, the demand can be estimated using a profit maximising function which is given by:⁵⁹

$$\pi_{i,j} = P_{i,j}(Q_{i,j}, Q_{i-1,j}, Q_{i-2,j}, \dots, Q_{n,j}, X_j) Q_{i,j} - C_{i,j}(Q_{i,j}, W_i) ER_{i,j}$$

Where:

$P_{i,j}$ – import price from exporter country i to importer country j

$Q_{i,j}$ – quantity imported from exporter country i to importer country j

X_j – explanatory variables affecting the demand model in importer country j

$C_{i,j}$ – indicative cost of exporter country i⁶⁰

W_i – cost shifters for importer country i such as producers price index

$ER_{i,j}$ –bilateral exchange between the importing and the exporting country

The extent of competition is then measured using Lerner's index by estimating the relative mark-up over the marginal cost of a country *i* as derived by differentiating the profit maximisation equation above. The Lerner's index implies an inverse relationship between this mark-up and the elasticity of demand from country *i* and is given by:

⁵⁸ Goldberg P, Knetter, M, 1999, *Measuring the intensity of competition in export markets*, Journal of International Economics, 47(1), 27-60.

⁵⁹ Alamri Y, Reed M, Saghaian, S, 2020, *Competition in the Saudi Arabian Market*, Bulg. J. Agric. Sci., 26 (2), 275-281.

⁶⁰ The cost variable uses the index j for importer country since the prices used in the model are at cif level, and therefore the cost would include freight and insurance.

$$\frac{P(Q) - MC(Q)}{P(Q)} = -\frac{1}{E}$$

Where: E – price elasticity of demand.

In a perfectly competitive market, the Lerner's index equals zero indicating no market power, whereas in a monopoly, the value of index equals one implying strong market power. International trade usually involves imperfect competition, and therefore Lerner's index provides a good measure of the degree of market power of each exporter due to various supply and demand factors.

However, given that marginal cost of producing a good in a country is hard to estimate, the Lerner's index can be derived from the elasticity of the good. *Goldberg & Knetter* introduced a two-stage regression to estimate the inverse residual demand elasticity. The model is given by:

$$\begin{aligned} \text{Log } P_t^{i,j} = & \lambda^j + \eta^j \text{Log } Q_t^{i,j} + \alpha^j T_t + \beta^j \text{Log}(IPC)^j + \sum_{k \neq i} \delta^{j,k} \text{Log } ER_t^{j,k} \\ & + \sum_{j \neq k} w^{j,k} \text{Log}(PPI)_t^{j,k} + \gamma^j \text{Log}(POP)^j + \varepsilon_t \end{aligned}$$

Where:

- i, k, j and $t - i$ and k are indices of exporter countries, j represents the importer, and t is the time index
- P — import price from exporter country i to importer country j
- Q – quantity imported from exporter country i to importer country j
- T – time trend
- IPC – real disposable income in importer country j
- PPI – producer price index
- POP – population in importer country j (total or expatriate)
- ER — bilateral exchange rate

The key point here is the coefficient of quantity which is the residual inverse elasticity and therefore the model specification is given in a double log so as to allow easy interpretation of coefficients as elasticities. It is also noted that the inter-dependence between price and quantity may result in endogeneity and need to be treated with the help of instrumental variable in a two-step regression. Previous studies have used lagged cost shifters such as exchange rate and production productivity indices, import quantities, import countries GDP, and production from competitor countries as instrumental variables as they are less likely to be influenced by the import price.⁶¹ It is also assumed that each exporter faces a downward sloping residual demand curve.

One of the drawbacks of this methodology is the requirement of monthly data on trade volumes, cif values, and macroeconomic indicators for the both the importing and

⁶¹ Alamri Y, Reed M, Saghalian, S, 2020, Competition in the Saudi Arabian Market, Bulg. J. Agric. Sci., 26 (2), 275-281.

exporting countries. Monthly data allows more observations to derive meaningful estimates for the elasticities as compared to annual datasets, which are not sufficiently large. Responder data on a monthly was unavailable for some of the key premium markets in the Middle East such as Jordan, and Israel.

Due to data restrictions, this econometric exercise was limited to New Zealand and Saudi Arabia. Monthly trade data for Saudi Arabia was obtained from the Australian Border force and used as proxy for responder data. The other data for the two countries were obtained from various sources as summarised in table D.2.

D.2 Data sources for the econometrics analysis

Data	Time period	Source
New Zealand monthly trade	Jan 2001 – Dec 2019	Infoshare
New Zealand quarterly GDP at constant prices	Jan 2001 – Dec 2019	Infoshare
New Zealand quarterly population estimate	Jan 2001 – Dec 2019	Infoshare
New Zealand exchange rate to USD	Jan 2001 – Dec 2019	Reserve Bank of New Zealand
Saudi Arabia monthly Trade data	May 2011 – Dec 2018	Australian Border Force
Saudi Arabia quarterly GDP at constant prices	May 2011 – Dec 2018	General Authority for Statistics
Monthly exchange rates Pakistan	May 2011 – Dec 2018	State Bank of Pakistan
Monthly exchange rate India	May 2011 – Dec 2018	International Monetary Fund
Monthly exchange rate Thailand	May 2011 – Dec 2018	International Monetary Fund
Annual producer productivity indices	May 2011 – Dec 2018	Food and Agricultural Organisation

Source: CIE

Quarterly and annual data were disaggregated based on a constant rate of change to obtain monthly data. The difference in time periods between New Zealand and Saudi Arabia is due to gaps in data reporting in the Middle East region. The models were tested for multicollinearity, autocorrelation, heteroskedasticity and endogeneity and were corrected for them where they were assessed to cause issues.

Table D.3 shows of imports of rice by New Zealand since 2015 from key rice exporters which form over 80 per cent of the rice market. Australian rice accounts for the largest

D.3 Rice Imports by New Zealand

Variable	Unit	2015	2016	2017	2018	2019	2020
Volume							
Australia	kt	16.3	17.8	17.1	18.7	17.3	11.0
Share	%	35.9	38.2	35.0	35.5	32.3	18.0
US	kt	3.9	3.7	5.3	4.0	4.0	4.8
Share	%	8.6	7.9	10.8	7.7	7.5	7.9
Thailand	kt	12.8	12.5	13.9	12.8	11.4	15.3
Share	%	28.1	26.8	28.5	24.4	21.3	25.1
India	kt	6.0	6.1	5.9	7.6	7.7	9.7
Share	%	13.1	13.1	12.2	14.5	14.4	16.0
Total	kt	45.4	46.5	48.8	52.7	53.7	61.0

Variable	Unit	2015	2016	2017	2018	2019	2020
Value (CIF)							
Australia	\$NZ m	23.7	26.8	26.4	30.1	30.6	22.0
Share	%	35.9	41.8	39.5	37.5	35.9	22.5
US	\$NZ m	6.3	5.1	6.7	6.5	6.7	8.2
Share	%	9.6	8.0	10.0	8.1	7.9	8.4
Thailand	\$NZ m	17.3	15.1	15.9	18.1	17.0	23.4
Share	%	26.2	23.6	23.9	22.5	20.0	24.0
India	\$NZ m	9.1	8.1	9.0	12.2	12.8	15.1
Share	%	13.8	12.7	13.4	15.2	15.1	15.5
Total	\$NZ m	66.0	64.0	66.8	80.3	85.3	97.6

Source: Statistics New Zealand (Infoshare).

share of the New Zealand market at an average of 35.5 per cent, followed by Thailand at 23.3 per cent.

Table D.4 presents the results of the model for the key exporters listed above.

- The coefficient associated with quantity represents the residual inverse elasticity of demand. Based on the result, the elasticity estimates for Australia, Thailand, USA are significantly different from zero, whereas the inverse elasticity for India is insignificant.
- The results indicate some level of imperfect competition and also scope for product differentiation. The product differentiation is also observed in the difference in the price ranges of Australian and Thai rice, where Australian rice ranged from \$NZ 145–180 per tonne and Thai rice from NZD 110-150 per tonne. The market power indicated for both the products can also be attributed to the geographical distance between New Zealand and the exporters.
- The level of market power, as indicated by the inverse elasticities, held by each exporter follows the same order as the market shares with Australia ranking the highest and United States the lowest.
- All models indicate that the import prices are sensitive to the Australian and Thai exchange rate which is consistent with economic logic given their dominance in the New Zealand market.

D.4 Inverse residual elasticities of key rice exporters in New Zealand

Variable	Australia		USA		India		Thailand	
	Coefficient	z value	Coefficient	z value	Coefficient	z value	Coefficient	z value
Quantity (log)	-0.63***	-10.92	-0.26***	-6.66	-0.05	-0.27	-0.51***	-3.99
Trend	0.002***	6.04	0.004***	5.73	0.001	0.8	0.001***	3.83
GDP per capita (log)	0.01	0.03	-0.08	-0.12	0.08	0.17	-0.44	-1.35
Thailand Exchange Rate (log)	0.47***	5.56	0.49***	3.34	1.03***	8.46		
Australia Exchange Rate (log)			-2.30***	-5.41	-1.14**	-2.78	-1.23***	-6.82

Variable	Australia		USA		India		Thailand	
India PPI (log)	-0.04	-0.94	0.13**	2.41			0.05	1.31
Australia PPI (log)			0.48***	5.65	0.03	0.63	0.45***	5.04
US PPI (log)	0.09	0.001			0.74***	5.99	0.48***	5.89
Constant	1.71	0.78	-4.23	-1.05	-6.71***	-2.24	-3.81**	-2.01
Summary reporting								
Number of Observations	227		226		228		227	
R ²			0.56					
Centred R ²	0.66				0.53		0.79	
Uncentered R ²	0.88				0.88		0.81	

Note: <0.01: ***, <0.05**, <0.1: *

Source: CIE.

A two-step regression model with appropriate instrumental variable was used for the estimation of elasticities in Australia, India, and Thailand.⁶² For the US model, we were unable to identify an appropriate instrument and therefore used an OLS estimator.

Rice is a staple in Saudi Arabian cuisine and with no domestic production, it is one of the key markets for rice exporters. The lion's share of the rice consumed in Saudi Arabia is supplied by India which accounts for 76.6 per cent of the market value, on average while Australia occupies around 2 per cent of the market. Table D.5 summarises rice import shares of each exporter.

D.5 Rice Imports by Saudi Arabia

		2014	2015	2016	2017	2018	2019
Volume							
India	kt	1 051	1 260	920	831	974	1 054
Share	%	73.6	76.0	73.2	71.7	75.3	75.1
USA	kt	104.6	108.3	113.3	127.3	92.0	104.4
Share	%	7.3	6.5	9.0	11.0	7.1	7.4
Pakistan	kt	151.6	133.5	107.0	89.7	93.9	136.0
Share	%	10.6	8.1	8.5	7.7	7.3	9.7
Thailand	kt	75.6	76.0	68.8	59.9	63.4	45.0
Share	%	5.3	4.6	5.5	5.2	4.9	3.2
Egypt	kt	0.9	11.8	3.8	0.5	0.8	1.1
Share	%	0.1	0.7	0.3	0.0	0.1	0.1
Australia	kt	24.7	38.6	16.8	19.5	30.4	16.2
Share	%	1.7	2.3	1.3	1.7	2.3	1.2
Total	kt	1 428	1 657	1 257	1 160	1 293	1 404

⁶² Australian exchange rate and PPI were used as instrumental variables for the Australian model. Similarly, the exchange rate and PPI were used as instruments for India and just PPI for Thailand.

		2014	2015	2016	2017	2018	2019
Value							
India	kt	1 414	1 218	751	788	1 036	1 110
Share	%	99.1	73.5	59.8	67.9	80.1	79.0
USA	kt	105	106	108	120	87	105
Share	%	7.3	6.4	8.6	10.3	6.8	7.5
Pakistan	kt	142	92	65	72	73	109
Share	%	9.9	5.6	5.2	6.2	5.6	7.7
Thailand	kt	62	58	46	37	50	37
Share	%	4.4	3.5	3.7	3.2	3.8	2.6
Egypt	kt	1	12	3	0	1	1
Share	%	0.0	0.7	0.2	0.0	0.0	0.1
Australia	kt	30	47	21	24	38	21
Share	%	2.1	2.8	1.6	2.1	3.0	1.5
Total	kt	1 428	1 657	1 257	1 160	1 293	1 404

Source: UN Trade data.

Table D.6 presents the results for Saudi Arabian model to estimate the inverse residual elasticity of demand for Australia.

- While the sign of the coefficient is logically correct, the elasticity is not significantly different to zero, thereby indicating a perfectly competitive scenario for Australian rice. This is consistent with the small market share held by Australia in an extremely competitive market.
- This model could not be replicated for other exporters due to lack of trade data on a monthly basis. It must also be noted that the overall confidence on the data reported in the ME region is medium to low and therefore the estimates may not be sufficiently robust.

These estimates are derived using an OLS model as opposed to a two-step regression as the hypothesis for endogeneity was rejected at a 10 per cent significance level.

D.6 Inverse Residual Elasticity for Australia in Saudi Arabia

Variable	Coefficient	z value
Quantity (log)	-0.00012	-0.02000
Trend	0.003***	7.53
GDP per capita (log)	-0.29	-0.91
Thailand Exchange Rate (log)	0.37***	2.20
US PPI (log)	0.01	0.09
Constant	1.24	0.30
Number of Observations	77	
R ²	0.79	

Source: CIE.

Conclusions from the econometrics

The inverse elasticity of demand measures the change in import price of the product in response to change in quantity.

One of the drawbacks of this approach is its sensitivity to data frequency, continuity and quality which makes this approach inapplicable to most countries from the Middle East region. As a result, the use of econometric analysis was restricted to New Zealand and Saudi Arabia.

The sensitivity of the estimates to the robustness of the data also limits the scope for interpretation to an ordinal basis rather than cardinal. That is, there is more confidence about the ranking of the estimates, but less confidence regarding the magnitude of those differences. Key insights from the results suggest:

- Australia, Thailand, and the United States have similar market power in the New Zealand rice market. The level of market power, as indicated by the inverse elasticities, held by each exporter follows the same order as the market shares with Australia ranking the highest and United States the lowest.
- The results indicate some level of imperfect competition in New Zealand but also scope for product differentiation. The product differentiation is also observed in the difference in the price ranges across Australian and Thai rice, where Australian rice ranged from NZD 145 to 180 per tonne and Thai rice from NZ\$110 to 150 per tonne between 2015 to 2020.
- Results from the Saudi Arabian model show that Australia faces a perfectly competitive market in Saudi Arabia.

These results are consistent and intuitive as Australia, Thailand, and United States account for over 60 per cent of the New Zealand's rice market. Imports from both Australia and the United States are essential to maintaining the medium grain supply in the New Zealand market. Of the two suppliers, Australia enjoys significantly higher market share due to its established market position with retailers and food service and freight proximity to New Zealand. On the other hand, Thailand operates as the majority supplier of long grain rice into New Zealand and therefore enjoys significant market presence in the market — whereas no market power was estimated for India and Pakistan. In Saudi Arabia, Australia occupies around 2 per cent of the total rice market share, and while it is recognized as a premium brand, the demand for medium grain may be more elastic relative to long-grain — which is a staple in Saudi Arabian cuisine.

E Drivers of market entry

The key question for this assessment is how much would potential entrants, of different business models and scale, would invest and loss-lead in the short term, through the duplication of SunRice infrastructure to develop their own supply chain?

Variable and under-utilisation of SunRice capital

Table E.1 shows that SunRice capacity currently dominates the rice milling and storage capacity — based on the historic footprint of the rice growing industry in the Riverina.

- Depending on crop size, the operational configuration of mills can be varied through the number of shifts (and number of operational hours per day) and number of days per week.
- We understand that the capacity of paddy storage in the Riverina by SunRice-owned Australian Grain Storage (AGS) is over 1 million tonnes and probably closer to 13 million tonnes.
- For the 2021 crop, 11 out of 15 receival depots for paddy were in operation.

E.1 Australian rice milling capacity

Facility	Indication of capacity	Location	Paddy or milled rice
			kt
SunRice	Rated annual mill capacity	Leeton	350
SunRice	Rated annual mill capacity	Deniliquin	450
SunRice	Rated annual mill capacity	Burdekin	25
Slater Farms	Current production milled	Casino	>3
Natural Rice Co	Proposed silos	Kyogle	10
Total			>838

Source: SunRice and media articles.

Similar to other early-stage processing facilities across agriculture, Australian rice mills were established more than 30 years ago and have maintained their competitiveness through ongoing expansions and (incremental) upgrades of component machinery including the addition of silos and drying capacity. For example, the first stage of the Deniliquin mill was constructed in the 1970s:

- an additional mill was added for brown rice was added in 1994

- the mill has been incrementally improved, for example, a \$2.5 million investment was made in 2011 after 3 years of closure due to lack of paddy ⁶³
- SunRice advised that this mill would be closed first if there was insufficient throughput.

Chapter 2 demonstrated that since the early 2000s, the industry has been characterised by variable paddy production — which is downward trending. In addition to its a-Class shareholding structure, throughput and asset utilisation is a key issue in the calculation of grower returns — as reflected by their Paddy Pricing Policy. ⁶⁴

SunRice has invested significantly in rice storage, milling and packaging assets in the Riverina Region and a sustainable supply of Riverina Rice is required to utilise and cover the costs of those assets; and

Under-utilisation of these storage, milling and packaging assets could result in a material impairment of their book value.

Due to substantial sunk costs in milling and related infrastructure, and the prospect that it will be underutilised relative to its total capacity for the foreseeable future, SunRice would appear to be in a dominant position relative to a new entrant into the milling sector in the Riverina.

Costs of market entry

Recent lessons from the grain industry is that it is now not necessary to have large centralised grain handling, processing and storage infrastructure.

Trends in infrastructure cost for micro and scalable capacity

Cost of key infrastructure components are falling:

- the past 5 years have demonstrated that the cost of grain storage, particularly vertical silos rather than bunker storage, has steady fallen despite increases in steel costs
- in the grain industry the cost and the embodied technology in augers and screening/sorting technology, particularly in mobile and high-volume applications, have made previous capacity at railheads obsolete
 - Rice requires specialised silos that prevent stack burn. Conventional silos can be retrofitted with air cooling for drying and to prevent stack-burn.
 - In terms of alternative uses, silos can also be used for wheat and barley but would contaminate the rice with gluten. Better alternatives include silos for are nongluten crops such as corn, pulses and oilseeds.
- driers are critical for the storage of rice and the prevention of stack burn

⁶³ <https://www.smh.com.au/national/rice-a-cereal-shaping-up-for-a-happy-ending-20110410-1d9dp.html>

⁶⁴ <https://corporate.sunrice.com.au/media/683677/paddy-pricing-policy-approved-september-2018.pdf>

- Moisture content at harvest is typically 18 to 22 per cent and usually requires 3 passes across a gas-fired dryer between silos — where the paddy is cooled before storage.
- Other equipment required includes paddy and milling separators, graders and packers.

Slater Farms located in the Northern Rivers have demonstrated that investment in this infrastructure is possible at a small scale (compared to SunRice infrastructure). The original motivation for this investment was to provide a dedicated storage and milling facility as part of their biodynamic product which requires a segregated supply chain.

Such an investment could well be scalable over time to an extent, where an entrant could add silos and gradually increase the utilisation of the mill.

The investment costs also include those involved with establishment of a brand, development of strategic alliances and the application to supermarket chains for access — especially for niche products. These costs are potentially more onerous in terms of time and cost than the physical infrastructure. This would be especially the case for the export market. For other agricultural exports, a 5-year time frame is not uncommon with a number of trial shipments required before contracts are finalised.

Options for new entrants — Riverina/Murray

There would be two broad options for a new entrant or group of growers working together:

- invest in new infrastructure in the Riverina region including: grain dryers, silo storage, rice mill and a pack-out facility (and product storage)
- purchase or group (dried) paddy rice and freight it to Melbourne for milling and packaging — this would require a drying facility to be located either on-farm or centrally accessible to growers in the Riverina.

An option would be to access other milling capacity that is available. There are also two options to access milling capacity:

- wheat and barley millings (that is largely underutilised) recognising that this is potentially a higher cost option as steps would be required to reduce the amount of gluten in the equipment for the majority of uses
 - For some cases, notably stated gluten-free products, this would not be an option.
- for corn, pulses (and possibly spices) where the equipment does not require cleaning for gluten.

Dependent on the setup of the facility, additional investment may be required for specialist milling equipment that includes polishing and colour-sorting. A mill that already that mills, blends and packs rice would be expected to have this equipment whereas a gluten-based mill will require additional investment.⁶⁵ The cost of this equipment depends on scale — small to medium scale sorters are available from China and Vietnam.

⁶⁵ Melbourne Milling is an example of a gluten-free facility that mills, sorts, grades and packs on commission — with a wide product coverage that includes rice.

In the case of a greenfield plant in the rice growing region, the required rated mill capacity would depend on the seasonal operation of a mill a given annual throughput:

- year-round operation would require lower daily capacity but more grain storage; alternatively
- higher daily throughput that allows milling closer to harvest time would require less grain storage but more product storage, which could be local or interstate.

F Details of the baseline and counterfactual scenarios

The baseline and scenarios for each deregulation option for this evaluation have been developed around the available data outlined in previous chapters and information obtained during the consultations.

Table F.1 lists key assumptions that underly the development of the baseline. We note that rice coproducts can be directed to other uses that are not accounted for, including:

- husks, typically 26 per cent of paddy rice, are used in livestock industries as bedding
- rice bran (after stabilising) can be used in stockfeeds and to produce oil
- rice brokens can be used in:
 - blended rice products that have a specification of brokens that is greater than the standard 4 to 5 per cent. It is likely that exports to the Pacific region include greater amounts of broken rice than in other markets with tighter specifications
 - rice flour manufacture: SunRice has reported the expansion of their rice flour business (as part of market shifts towards non-gluten products)
 - stockfeeds such as layer and broiler rations and petfood.

Over the crop years 2011 to 2018, SunRice communications indicate a weighted average milling rate of 55 per cent — varying between 48.3 and 59.3 per cent — which may incorporate paddy that did not meet specification.⁶⁶ SunRice presentations during the consultation, indicated a milling yield of 60 per cent was expected for the 2021 crop year. Estimates for the Northern Rivers industry was taken from estimates provided by key stakeholders during consultation.

F.1 Key yield assumptions for the baseline^a

		Riverina	Northern Rivers
Rejects	%	2	2
Brown rice	%		
– brokens yield	%	4-5	4-5
– product yield	%	74	74
White rice			
– bran yield	%	8	8-10
– brokens yield	%	6	7
– product yield	%	59	60

^a For Paddy rice delivered

Source: Industry consultation. SunRice presentations.

⁶⁶ https://investors.sunrice.com.au/FormBuilder/_Resource/_module/2weQNICYSUy13FE_jxQXvg/file/presentations-webcasts/2018/Ricegrowers_Limited-Rice-Industry-Field-Day-CEO-Presentation.pdf

To develop a consistent picture of the supply and use of Australian rice produced in the Riverina. This baseline is set out in table F.2 and F.3.

Domestic sales, through retail and food service, is a significant data gap for this project as was stockholding by SunRice which is used to smooth-out:

- mill capacity utilisation and of packing rooms; and therefore
- product availability to key markets where maintenance of brand presence is critical such as Australia, New Zealand and Saudi Arabia.

Due to the imperative to maintain mill utilisation, it has assumed that the majority of stocks are held in paddy form.

- SunRice's wholly-owned subsidiary Australian Grain Services owns and operates Riverina based grain storage infrastructure with capacity exceeding 1 million tonnes. In 2005, the RMB reported a static capacity of 1.3 million tonnes across 20 receival sites.
- Given recent crop sizes, SunRice has more than enough capacity to hold paddy stocks once dried.

RMB provided data to this project on closing stock levels as of June each year, recorded across licenced buyers, rather than at the end of the crop year. The timing of this data restricted its use, as it did not separately identify new season and carryover product. Given this constraint and observed production and export data, stock levels were used to smooth-out domestic rice disappearance, and total per person consumption of rice that includes imports.

In addition, additional assumptions were required on the split between brown and white rice sold in the domestic market.

- Over the past 10 years, the proportion of brown rice exported varied between 1.0 and 16 per cent of the total exports on a product basis, but since 2015-16 has averaged 1.5 per cent.
- For the domestic market, the sales of brown rice as a proportion of domestic disappearance was assumed to be around 2 per cent — in line with export patterns to New Zealand.
- Total production of brown rice was then the total of domestic and exports — which is assumed to account for around 1.5 per cent in paddy equivalents.

Baseline for the Riverina/Murray region

As noted, SunRice indicate expects production levels of 400-800 kt of paddy would be the production in the Riverina Region 'when a reasonable supply of irrigation water is available'.

- For the 2022 crop year, SunRice is planning for a crop around 700kt due to a high-rainfall year and the amount of water available in storages.

F.2 Baseline for the Riverina

Australian Crop year		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Farms	no	1 625	1 293	1 105	408	1 169	930	100	100	674	1 046	896	896	896	896
Area harvested	ha	112.8	78.5	66.1	22.2	80.1	59.6	5.1	4.2	44.0	68.0	58.3	58.3	58.3	58.3
Average yield		10.3	10.5	10.4	11.0	10.0	10.4	10.8	10.6	10.4	10.3	10.3	10.3	10.3	10.3
Milled production															
Paddy production		1 158	826	685	244	799	622	55	45	458	700	600	600	600	600
—after rejects	kt	1 135	809	672	239	783	610	54	44	449	686	588	588	588	588
Closing stock level ^a	kt	397	202	168	0	157	152	3	0	90	206	118	118	118	118
- in production	%	35	25	25	0	20	25	5	0	20	30	20	20	20	20
Change in stocks	kt	98	- 124	6	- 122	151	49	- 246	- 3	90	120	- 90	0	0	0
Milled paddy	kt	1 347	1 004	706	407	626	614	203	47	359	570	676	588	588	588
Product yield															
Total	kt pw	651	576	413	224	358	316	112	26	215	336	399	347	347	347
Domestic															
Total	kt pw	103.6	98.7	105.3	89.8	75.4	69.5	8.5	2.2	50.0	80.0	80.0	80.0	80.0	80.0
Exports															
Total	kt pw	546.9	477.7	307.7	133.7	282.8	246.5	103.3	23.4	161.6	261.2	328.2	274.0	274.0	274.0

^a Closing stocks were chosen to smooth-out domestic disappearance and per person consumption of domestic and imported rice.

Source: ABF and CIE.

F.3 Baseline Riverina exports by market and market group

REDACTED

Source: ABF and CIE.

Over the crop years 2011 to 2021, average paddy production was just over 600 kt. This production level with the baseline or steady-state production for the economic analysis for 2023 onwards.

In terms of sales to the domestic and export markets, the baseline assumes that the market composition for the 5 baseline years looks like an average of the 2017 and 2018 crop when average production was around 700 kt paddy. In the baseline, SunRice has the SEEL, and it is assumed that they resume a reasonably normal sales pattern across export markets as happened in the 2017 and 2018 crop years. As noted, in line with SunRice policy, SunRice no longer export bulk other than to the Japanese tender market — which they did in the 2017 and 2018 crop years.

Northern Rivers region

Baseline

In contrast to the Riverina/Murray industry, the Northern Rivers is currently relatively small. One of the challenges for this project was the absence of formal statistics especially for recent years — including the lack of reliable estimates from the Australian Bureau of Statistics and where the RMB has not reported data since 2016.

Table F.4 shows the Northern Rivers baseline for the evaluation. Given information from the consultation and from media, it is likely that over 1 000 hectares of rice will be grown in the Richmond Valley given reasonable seasonal conditions.

Given no change in the regulatory environment, the focus of the supply chain will be on maintaining and increasing its current suppliers. In the baseline over the next 6 years, the supply of paddy in the region is expected to increase from 5.4 to 6.8 kt. It is noted that investment in drying and storage capacity is underway that would increase the regions capacity to over 8 kt.

Because this cropping system is not irrigated, growers in the region indicate that yields can be highly variable — between 2.5 and over 7 tonnes per hectare. For the purposes of the baseline, an average yield of 4.5 tonnes per hectare was used and an average milled yield for white rice of 60 per cent.

- Consultation indicated that there is an even split between white and speciality rice varieties in the region.
- Current indicative farm gate paddy prices for both white and black rice are reported to be around \$450 per tonne delivered.

F.4 Baseline for Northern Rivers region

		2020	2021	2022	2023	2024	2025	2026
Paddy production								
Ricegrowers	no	20	20	21	22	23	24	25
Average land planted	ha	40	60	60	60	60	60	60
Total land planted	ha	800	1 200	1 260	1 320	1 380	1 440	1 500
Production split								
– White varieties	%	50	50	50	50	50	50	50
– Speciality varieties	%	50	50	50	50	50	50	50
Paddy yield								
– White varieties	t/ha	7.0	4.5	4.5	4.5	4.5	4.5	4.5
– Speciality varieties	t/ha	7.0	4.5	4.5	4.5	4.5	4.5	4.5
Paddy production								
– White varieties	kt	1.6	1.6	1.7	1.7	1.8	1.9	2.0
– Speciality varieties	kt	2.0	1.9	2.0	2.1	2.2	2.3	2.4
Total paddy production	kt	3.6	3.5	3.7	3.8	4.0	4.2	4.4
– <i>proportion of Riverina production</i>	%	14.1	1.6	1.1	1.0	1.2	1.2	1.3
Paddy returns								
– White varieties	\$/t	450	450	450	450	450	450	450
– Speciality varieties	\$/t	450	450	450	450	450	450	450
Farm revenue								
– White varieties	\$m	1.23	1.19	1.25	1.31	1.37	1.43	1.49
– Speciality varieties	\$m	1.23	1.19	1.25	1.31	1.37	1.43	1.49
Total	\$m	2.47	2.38	2.50	2.62	2.74	2.86	2.98
Product yield								
– White varieties	kt	1.6	1.6	1.7	1.7	1.8	1.9	2.0
– Speciality varieties	kt	2.0	1.9	2.0	2.1	2.2	2.3	2.4
Total saleable product	Kt	3.6	3.5	3.7	3.8	4.0	4.2	4.4

Source: Consultation and CIE.

Counterfactuals

Evidence from the consultation was that increases in production are anticipated given improved access to the domestic market (see table F.5). This increase in production is based around a core of specialist rice growers and involves attracting an increase in growers who include rice as part of their rotations and plant into paddocks that may be otherwise uncultivated.

By the 2026 crop year, it is expected that in the baseline production in the region could increase to around 14.1 kt— which is within the scope of existing and planned storage in the region.

- There would not be any significant change in the varietal mix from the baseline.
- All of this crop would be sold on the domestic market.

F.5 Greater domestic market access – Northern Rivers region

		2020	2021	2022	2023	2024	2025	2026
Paddy production								
Ricegrowers	no	20	20	24	28	32	36	40
Average land planted	ha	40	60	64	68	72	76	80
Total land planted	ha	800	1 200	1 536	1 904	2 304	2 736	3 200
Production split								
– White varieties	%	50	50	50	50	50	50	50
– Speciality varieties	%	50	50	50	50	50	50	50
Paddy yield								
– White varieties	t/ha	7.0	4.5	4.5	4.5	4.5	4.5	4.5
– Speciality varieties	t/ha	7.0	4.5	4.5	4.5	4.5	4.5	4.5
Paddy production								
– White varieties	kt	2.7	2.6	3.4	4.2	5.1	6.0	7.1
– Speciality varieties	kt	2.7	2.6	3.4	4.2	5.1	6.0	7.1
Total paddy production	kt	5.5	5.3	6.8	8.4	10.2	12.1	14.1
– <i>proportion of Riverina production</i>	%	12.2	1.2	1.0	1.4	1.7	2.0	2.4
Paddy returns								
– White varieties	\$/t	450	450	450	450	450	450	450
– Speciality varieties	\$/t	450	450	450	450	450	450	450
Farm revenue								
– White varieties	\$m	1.23	1.19	1.52	1.89	2.29	2.71	3.18
– Speciality varieties	\$m	1.23	1.19	1.52	1.89	2.29	2.71	3.18
Total	\$m	2.47	2.38	3.05	3.78	4.57	5.43	6.35
Product yield								
– White varieties	kt	1.6	1.6	2.0	2.5	3.0	3.6	4.2
– Speciality varieties	kt	2.0	1.9	2.4	3.0	3.7	4.3	5.1
Total saleable product	Kt	3.6	3.5	4.5	5.5	6.7	8.0	9.3

Source: Consultation and CIE.

In the case where there is access to both domestic and export markets, shown in table F.6, the ability to diversify their market base to include exports provides growers with greater certainty of longer term markets and prices — with number of growers tripling,

compared to the baseline, and the addition of more land that result in higher average crop sizes.

For this scenario, up to 6 000 hectares could be planted by the 2026 crop year. As a check, Aither (2018) estimated that approximately 10 000 hectares are being used for soybeans in the region, where rice could be substituted, and that this is a small proportion of the total area identified by industry stakeholders as being suitable for growing rice, which ranged from 25 000 to 70 000 hectares. Consultation with industry in the region indicated 40 000 hectares — where 6 000 hectares in the scenario represents 15 per cent of this total.

F.6 Greater domestic and export market access — Northern Rivers region

		2020	2021	2022	2023	2024	2025	2026
Paddy production								
Ricegrowers	no	20	20	28	36	44	52	60
Average land planted	ha	40	60	68	76	84	92	100
Total land planted	ha	800	1 200	1 904	2 736	3 696	4 784	6 000
Production split								
– White varieties	%	50	20	16	12	8	30	30
– Speciality varieties	%	50	80	84	88	92	70	70
Paddy yield								
– White varieties	t/ha	7.0	4.5	4.5	4.5	4.5	4.5	4.5
– Speciality varieties	t/ha	7.0	4.5	4.5	4.5	4.5	4.5	4.5
Paddy production								
– White varieties	kt	2.7	1.1	1.3	1.4	1.3	6.3	7.9
– Speciality varieties	kt	2.7	4.2	7.1	10.6	15.0	14.8	18.5
Total paddy production	kt	5.5	5.3	8.4	12.1	16.3	21.1	26.5
– <i>proportion of Riverina production</i>	%	12.2	1.2	1.2	2.0	2.7	3.5	4.4
Paddy returns								
– White varieties	\$/t	450	450	450	450	450	450	450
– Speciality varieties	\$/t	450	460	465	470	470	470	470
Farm revenue								
– White varieties	\$m	1.23	0.48	0.60	0.65	0.59	2.85	3.57
– Speciality varieties	\$m	1.23	1.95	3.28	4.99	7.05	6.94	8.71
Total	\$m	2.47	2.42	3.88	5.64	7.63	9.79	12.28
Product yield								
– White varieties	kt	1.6	0.6	0.8	0.9	0.8	3.8	4.8
– Speciality varieties	kt	2.0	3.0	5.1	7.6	10.8	10.6	13.3
Total saleable product	Kt	3.6	3.7	5.9	8.5	11.6	14.4	18.1

Source: Consultation and CIE.

Although this level of his paddy production is 5 times current levels, it is reasonably conservative and represents just over 50 per cent of the maximum 50 kt potential level identified — given sufficiently high prices — and only 4.5 per cent of production in the Riverina/Murray region in a reasonable production year.

In terms of markets, this report has identified that this product is currently sold predominantly through speciality retail and food service. Opening up exports provides growers in this region with the capacity to diversify their sales base and to access markets that pay more for speciality products.

- In terms of product and competition with Riverina/Murray region product, the Northern Rivers produces white rice marketed under sustainable branding, and speciality varieties (including coloured rice) or speciality production systems (biodynamic).
- Given these improvements, it would be reasonable to expect that there would be market signals for a higher proportion of speciality varieties based on the regions branding and positioning — which would attract an additional premium.

The most obvious export market to target would be New Zealand because of ease of access, comparatively low freight costs and similar market segments to Australia. The supply chain would however have similar problems to Australia in gaining access to the supermarket and food service chains — where other players have an established presence.

Other markets that could be targeted are those that are most likely to pay premium for niche rice prices with sustainability credentials such as:

- Japan — under CPTPP Australian has access outside of the SBS tender system.
 - Japan is a complex market to access especially for small exporters without a history of exporting to similar countries or who do not have strategic alliance with customers in-market.
 - An opportunity would be however, be the emerging speciality food market based on sustainability and health credentials of the product. This is especially the case for the varieties suited to Japanese cuisine such as Tachiminori.
 - This is particularly the case for certified biodynamic/organic product that could be freighted in mixed consignments with similar products to speciality outlets.
- Saudi Arabia, Israel and possible the UAE — where there are higher incomes but also consumer trends to more sustainably sourced foods.
 - For example, there is a push for sustainably sourced foods in high-end food service in the United Arab Emirates. ⁶⁷
- The Australia- United Kingdom Free Trade Agreement (A-UK FTA) also provides a new opportunity for NSW supply chains. There are a number of parallels between the UK and Australian markets including consumer preferences and the dominance of the supermarket chains.

⁶⁷ <https://fridaymagazine.ae/food/food-trends/sustainable-food-in-the-uae-fad-or-tren-1.2306778>

<https://www.caterermiddleeast.com/ingredients/88517-sustainable-food-start-up-to-supply-produce-to-hilton-hotels>

- Similar to Japan, a relatively small-scale exporter would need to develop a strategic alliance with a UK customer and/or target speciality retail.

It is noted that all these prospective markets can also be accessed by existing supply chains including SunRice who is focused on the UK market ⁶⁸ — who also have diversified their product lines to encompass speciality production systems such as organic and varieties such as Koshihikari. Also, over the short to medium term, they have the capability to develop other speciality lines such as coloured rice.

Table F.7 shows the distribution of these sales in a deregulated market. While the current market situation requires greater diversification of sales away from the domestic market and to premium export markets, the domestic market will remain important. New Zealand is likely to be the next target due to its proximity and its similarity to the domestic market.

In the short to medium term, prospective premium markets also include Japan and the high-income markets in the Middle East.

F.7 Market counterfactual for Northern Rivers region

		2020	2021	2022	2023	2024	2025	2026
Domestic	kt	3.6	3.7	5.4	7.0	8.5	9.2	10.0
Export	kt	0.0	0.0	0.5	1.5	3.1	5.2	8.1
– Middle East	kt	0.0	0.0	0.2	0.5	1.0	1.7	2.7
– Japan/United Kingdom	kt	0.0	0.0	0.0	0.1	0.2	0.4	0.5
– New Zealand	kt	0.0	0.0	0.3	0.9	1.7	2.9	4.5

Source: Consultation and CIE.

Large Riverina ricegrowers

Baseline

In a case where there is removal of current regulations, the established supply chain will remain the dominant player in the Australian rice market due to its market position and corporate size. There however, will be scope for ricegrowers in the Riverina/Murray region to breakaway and find alternative paths to market for their product. These growers could include those that:

- already supply to Grower's Pool or currently have a domestic buyers licence
- would choose re-enter ricegrowing.

The key incentive for leaving the Grower's Pool is that they expect they can achieve better farm-gate returns and have greater control over production decisions. In practice this group would comprise of growers who either want to market their product under their own brand or under a brand different to the established supply chain — ultimately

⁶⁸ <https://www.dfat.gov.au/sites/default/files/aukfta-submission-sunrice-group.pdf>

to receive a higher price for their paddy. In addition, there is scope for these growers to plant different combinations of varieties than is currently the case.

As identified in chapter 2, the profile of rice varieties planted in this region are determined by the requirements in the supply chain. In some years, seed for particular varieties will not be supplied for planting. Normally, businesses would choose a combination of crops and varieties that optimise returns by trading-off expected gross margins (yields versus price received and costs) against risk — which includes the ease or difficulty of the crop to grow.

Table F.8 illustrates these tradeoffs by comparing two premium varieties with Reiziq — which makes up the majority of paddy that goes into the supply chain based on announced pool prices by variety in 2021, and what would be reasonable yields over a 6-year period and for growers in the top-20 per cent.

F.8 Riverina/Murray paddy gross margins for 2022 crop year^a

		Doongara		Reiziq		Koshihikari	
		2016-2020 average	Top 20% growers	2016-2020 average	Top 20% growers	2016-2020 average	Top 20% growers
Price	\$/tonne	450	450	400	400	550	550
Yield	tonnes/ha	11.3	13.3	11.0	13.5	7.6	9.1
Revenue	\$/ha	5 103	5 985	4 380	5 400	4 180	5 005
Variable costs including water	\$/ha	1 430	1 430	1 430	1 430	1 430	1 430
Gross margin	\$ per ha	3 673	4 555	2 950	3 970	2 750	3 575

^a Based on average yield over the period 2016 to 2020 as shown in the NSW DPI Rice variety guide 2020–2021.^b Assumes the same variable cost per hectare based on drill sowing in the MIA for 2019 as reported by SunRice.

Source: https://investors.sunrice.com.au/FormBuilder/_Resource/_module/2weQNICYSUy13FE_jxQXvg/file/Media_Releases/190613_SunRice%20Media%20Release_C19%20Harvest_Harvest_FINAL.pdf and https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/1248309/RVG-2020-2021-web.pdf

Given current relative returns and expected yields, Koshihikari appears to be a poor choice based on yields across districts and for top-20 per cent growers. However, this analysis will change if a grower believes that they can obtain a higher paddy return than that offered by the growers' pool — and when they have an advantage in growing it.

Table F.9 shows the construction of the average yields used in this analysis reflecting that these growers are in the top 20 per cent of the region. A key assumption was that the yields achieved by this group are represented by the top-20 per cent in the region as recorded by the NSW DPI Rice variety guide 2020.

F.9 Calculation of average yields for the Breakaway group

	Yields of DPI Top-20% growers	Approximate proportion of land planted by variety
	t/ha	%
Core SunRice varieties		
Reiziq	13.5	80
Sherpa	12.6	20
– weighted average	13.3	100
Premium varieties		
Doongara	13.3	55
Langi	11.5	35
Koshihikari	9.1	10
– weighted average	12.3	100

Source: NSW DPI Rice variety guide 2020–2021 and Industry consultation.

Consultation with industry revealed that three core varieties would be grown and marketed over the short to medium term — a key factor behind this decision was that Plant Breeders Rights had expired.

To illustrate this scenario, we have assumed that there are a core of larger growers who may leave the SunRice supply chain. In the baseline, there could be a core of 15 growers are planting areas to rice substantially greater than the average — 150 hectares compared 60 to 65 hectares across all ricegrowers (see table F.10).

Within a multi-enterprise system, the majority of ricegrowers use at least two varieties. We have assumed that in the baseline, varieties planted are in line with the requirements of the established supply chain — 80 per cent of the standard product line and 20 per cent which includes higher value and specialist lines. Premium varieties have a marginally lower yield for top 20 per cent producer than the standard varieties such as Reiziq.

These businesses are in the top 20 per cent of growers, and would obtain yields around 20 per cent higher than the regional average, depending on the variety.

F.10 Baseline for breakaway Riverina group^a

		2020	2021	2022	2023	2024	2025	2026
Paddy production								
Ricegrowers	no	15	15	15	15	15	15	15
Average land planted	ha	30	100	100	100	100	100	100
Total land planted	ha	450	1 500	1500	1 500	1 500	1 500	1 500
Production split								
– Reiziq/Sherpa	%	80	80	80	80	80	80	80
– Langi/Doongara/Koshihikari	%	20	20	20	20	20	20	20

		2020	2021	2022	2023	2024	2025	2026
Paddy yield								
– Reiziq/Sherpa	t/ha	13.3	13.3	13.3	13.3	13.3	13.3	13.3
– Langi/Doongara/Koshihikari	t/ha	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Paddy production								
– Reiziq/Sherpa	kt	15.7	15.7	15.7	15.7	15.7	15.7	15.7
– Langi/Doongara/Koshihikari	kt	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Total paddy production	kt	19.3	19.3	19.3	19.3	19.3	19.3	19.3
– <i>proportion of Riverina production</i>	%	12.9	4.2	2.8	3.2	3.2	3.2	3.2
Paddy returns								
– Reiziq/Sherpa	\$/t	750	400	400	400	400	400	400
– Langi/Doongara/Koshihikari	\$/t	800	450	450	450	450	450	450
Farm revenue								
– Reiziq	\$m	3.5	6.3	6.3	6.3	6.3	6.3	6.3
– Premium variety	\$m	0.9	1.6	1.6	1.6	1.6	1.6	1.6
Total	\$m	4.4	7.9	7.9	7.9	7.9	7.9	7.9
Product yield								
– Reiziq	kt	2.8	9.4	9.4	9.4	9.4	9.4	9.4
– Premium variety	kt	0.6	2.2	2.2	2.2	2.2	2.2	2.2
Total saleable product	Kt	3.5	11.6	11.6	11.6	11.6	11.6	11.6

Source: Consultation and CIE.

All of this product would be sold to the existing supply chain. Following announced pricing, the average premium for speciality varieties is assumed to be around \$50 per tonne — recognising that varieties such as Koshihikari that attract a significantly larger premium, would form a relatively small share of the total planting.

Counterfactual

The counterfactual for this group is shown in table F.11. Under this scenario, deregulation of the domestic market would allow these growers to realign their production towards higher-value varieties which could be sold under their own, or a new, brand.

- All of this product would be diverted again from the existing supply chain.
- However, with limited scope to diversify across markets, the capacity to attract new growers will be limited — resulting in no significant change to the total area planted from the baseline.
- For the purposes of this scenario, it has been assumed that there is a \$20 per tonne improvement in the farm gate price as a result of the change in branding and market positioning.

F.11 Greater domestic market access – Riverina/Murray breakaway

		2020	2021	2022	2023	2024	2025	2026
Paddy production								
Ricegrowers	no	15	15	15	15	15	15	15
Average land planted	ha	30	100	100	100	100	100	100
Total land planted	ha	450	1 500	1500	1 500	1 500	1 500	1 500
Production split								
– Reiziq/Sherpa	%	0	0	0	0	0	0	0
– Langi/Doongara/ Koshihikari	%	100	100	100	100	100	100	100
Paddy yield								
– Reiziq/Sherpa	t/ha	13.3	13.3	13.3	13.3	13.3	13.3	13.3
– Langi/Doongara/ Koshihikari	t/ha	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Paddy production								
– Reiziq/Sherpa	kt	0.0	0.0	0.0	0.0	0.0	0.0	0.0
– Langi/Doongara/ Koshihikari	kt	5.4	18.0	18.0	18.0	18.0	18.0	18.0
Total paddy production	kt	5.4	18.0	18.0	18.0	18.0	18.0	18.0
– <i>proportion of Riverina production</i>	%	12.1	3.9	2.6	3.0	3.0	3.0	3.0
Paddy returns								
– Reiziq/Sherpa	\$/t	750	400	400	400	400	400	400
– Langi/Doongara/ Koshihikari	\$/t	800	470	470	470	470	470	470
Farm revenue								
– Reiziq/Sherpa	\$m	0.0	0.0	0.0	0.0	0.0	0.0	0.0
– Langi/Doongara/ Koshihikari	\$m	4.3	8.5	8.5	8.5	8.5	8.5	8.5
Total	\$m	4.3	8.5	8.5	8.5	8.5	8.5	8.5
Product yield								
– Reiziq/Sherpa	kt	0.0	0.0	0.0	0.0	0.0	0.0	0.0
– Langi/Doongara/ Koshihikari	kt	3.2	10.8	10.8	10.8	10.8	10.8	10.8
Total saleable product	kt	3.2	10.8	10.8	10.8	10.8	10.8	10.8

Source: Consultation and CIE.

In terms of credits to the paddy price from milling coproducts such as rice hulls and bran, this revenue is one component of the price milled rice and paddy that has been assumed as part of this analysis.

- There was no indication of the contribution of coproducts to overall revenue for the new supply chain — other than markets and uses had been identified as part of their business case and that this had been factored into the paddy price.
- If this information were available, any comparison with the existing supply chain would not be possible as it is also not known how these credits contribute to the paddy price paid — especially when considering the range of other adjustments made in the

paddy pricing policy — and the fact that these credits are linked to indicators outside of the supply chain.⁶⁹

With access to both domestic and export markets, there would be sufficient incentives in terms of returns, for additional growers to leave the current Growers' pool (see table F.12). This improvement could come through either the development of their own supply chain or tapping into the existing supply chain and brands of a new market entrant such as another food multinational or corporate business. and either market their own rice or under a different brand.

The potential impact of this scenario is different to the Northern Rivers — rather than principally an expansion of land use production, there is an opportunity to attract more producers to the supply chain and earn higher average prices at the farm gate by reconfiguring production and through the use of differentiated branding and marketing.

- By 2027, the number of growers in the group could increase to 30 with total paddy production around 50 kt.
- For this scenario, stakeholders have indicated that growers would require a base premium of \$30 per tonne above the current pool — to justify leaving the pool and covering the required investments. Over the longer term, it may be possible to increase this premium by investing in a larger marketing campaign and through the development of strategic alliances.

F.12 Greater domestic and export market access —breakaway group

		2020	2021	2022	2023	2024	2025	2026
Paddy production								
Ricegrowers	no	15	15	18	21	24	27	30
Average land planted	ha	30	100	106	113	119	125	125
Total land planted	ha	450	1 500	1 913	2 363	2 850	3 375	3 750
Production split								
– Reiziq/Sherpa	%	80	0	0	0	0	0	0
– Langi/Doongara/ Koshihikari	%	20	100	100	100	100	100	100
Paddy yield								
– Reiziq/Sherpa	t/ha	13.3	13.3	13.3	13.3	13.3	13.3	13.3
– Langi/Doongara/ Koshihikari	t/ha	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Paddy production								
– Reiziq/Sherpa	kt	4.8	0.0	0.0	0.0	0.0	0.0	0.0
– Langi/Doongara/ Koshihikari	kt	1.2	19.6	24.9	30.8	37.1	44.0	48.9

⁶⁹ It is noted that the SunRice transfer prices for coproducts used by CopRice re are benchmarked annually to the wheat price and broken rice supplied for flour milling is benchmarked annually to the Creed Rice Index or market price for broken.

		2020	2021	2022	2023	2024	2025	2026
Total paddy production	kt	5.9	19.6	24.9	30.8	37.1	44.0	48.9
– proportion of Riverina production	%	13.2	4.3	3.6	5.1	6.2	7.3	8.1
Paddy returns								
– Reiziq/Sherpa	\$/t	400	400	400	400	400	400	400
– Langi/Doongara/Koshihikari	\$/t	480	480	480	480	480	480	480
Farm revenue								
– Reiziq/Sherpa	\$m	3.6	0.0	0.0	0.0	0.0	0.0	0.0
– Langi/Doongara/Koshihikari	\$m	0.9	9.2	11.7	14.5	17.5	20.7	23.0
– Reiziq/Sherpa	\$m	4.5	9.2	11.7	14.5	17.5	20.7	23.0
Product yield								
– Reiziq/Sherpa	kt	2.9	0.0	0.0	0.0	0.0	0.0	0.0
– Langi/Doongara/Koshihikari	kt	0.7	11.7	15.0	18.5	22.3	26.4	29.3
Total saleable product	kt	3.6	11.7	15.0	18.5	22.3	26.4	29.3

Source: Consultation and CIE.

By 2027, paddy production from this group would represent around 8 per cent of the total production in the Riverina/Murray region — which is diverted from the existing supply chain.

Over a 6-year period, the distribution of product across markets is shown in table F.13 would be similar for the Northern Rivers — a mix of domestic and export markets that mitigate risks and permit targeting of specific consumer segments.

F.13 Market counterfactual for the breakaway group

		2020	2021	2022	2023	2024	2025	2026
Domestic	kt	3.6	11.7	13.5	14.8	15.6	15.8	14.7
Export	kt	0.0	0.0	1.5	3.7	6.7	13.2	14.7
– Middle East	kt	0.0	0.0	0.4	1.1	2.0	4.0	4.4
– Japan/United Kingdom	kt	0.0	0.0	0.3	0.7	1.3	2.6	2.9
– New Zealand	kt	0.0	0.0	0.7	1.8	3.3	6.6	7.3

Source: Consultation and CIE.

Freight costs

As is the case with milling credits, it is not possible for this evaluation to verify the ability of the alternative supply chains to obtain freight at ‘competitive rates’. A key assumption is that part of these business cases, the cost of freight has been factored into both of their milling and paddy prices and a cost. We note that the consultation identified cost-alternative and cost-effective freight such as the use of mixed consignments.

G Overview of the economic model

An ideal approach to understanding the impact of the scenarios to be evaluated in this report would be to develop an economic model of world production and consumption of rice that explicitly identifies:

- exports of NSW rice to more than 30 markets that make up 80 per cent of total export volumes — including freight costs required to each market
- other competitors in each market and an assessment to the extent to which their product is a substitute for NSW rice
- the costs and prices of each of the NSW rice supply chains including paddy pricing, costs involved in drying, storage, milling, packaging and marketing and including coproduct credits
- linkages between rice growing and respective NSW regions — particularly through competition for land and water and through demand for other inputs such as labour.

Such an approach is beyond the scope of this evaluation, however, an economic model based on value chains has been specifically developed to address the central question of the evaluation — the likely impacts of increased competition in specific markets for new entrants and the existing supply chain.

The purpose of the model is used to ensure the internal consistency of the scenarios, to allow for second round effects, and to keep track of the different flows of domestic production and exports for the different producer groups. The key outputs in each scenario are simulated within the model, and then this output is used for the final analysis of the scenarios.

The final output differs from the scenario inputs because of second round effects and reallocation within the model. These second-round effects include:

- responses to changes in relative prices of milled rice
- the diversion of product that results between supply chains and between export markets.

Overview of the model's structure

The detail and the structure of the model was based around the available data shown in table 4.6 and is summarised in table G.1.

For this model, the NSW industry is comprised of 3 different value chains that compete in 5 marketing groupings that include the domestic market.

G.1 Markets targeted by supply chains in scenario 2

Market	Existing Southern NSW supply chain		Northern NSW Rivers
	Grower's pool	Breakaway group	
Domestic market	✓	✓	✓
New Zealand	✓	✓	✓
Middle East	✓	✓	✓
Japan	✓	✓	✓
Other export markets	✓	✗	✗

Source: CIE.

- In the case of existing NSW rice exports, we note that the other markets grouping is a very large and diverse but is an important component of how the existing supply chain would react. That is, it would respond to increased competition in, say, the domestic market and New Zealand markets by diverting some of the product to another market grouping.
- As the benchmark competitor for the NSW industry, Californian exports has also been included for each of these markets of interest to reflect that the new supply chains would not only be competing exclusively with SunRice product but with other suppliers.

The economic model can be summarised with the following attributes. It:

- is partial equilibrium — in that it doesn't not capture links with related industries or markets that are not explicitly identified
- uses conventional microeconomic theory — consumer and producer behaviour represented by elasticities
 - It does not incorporate monopolistic behaviour by the incumbent business ⁷⁰ but rather includes reflects outcomes where markets are cleared and there is no 'over supply' problem.
- relies on a 'typical year' representation and is 'comparative dynamic' and time-based
 - It identifies 7 years, but these are not formally linked. Rather than forecasting, this model was developed to answer 'what-if' questions and quantify the scenarios set out in appendix F.
 - The choice of timeframe is based around the information provided from the consultation that informed the scenarios.
- is constructed and solved using the GEMPACK suite of programs
 - The model has 1 300 variables and 750 equations and uses non-linear solution.
- is amenable to sensitivity analysis.

⁷⁰ See the learnings from previous modelling of the Barley export single desk in chapter 3.

Consumer and user behaviour in each market

In each market, there is scope to substitute between supply medium-grain rice. As noted, a key observation is that new market entrants are unlikely to compete head-on with either established Australian or US product but differentiate their product.

Several different demand options were also considered which revolved around the extent of substitution that would be likely to occur in each market:

- No substitution with existing products. This would be the case for a new product where there is an increase in per person expenditure such that there is no impact on the existing rice consumption in the first round.
- Medium or moderate substitution, where there is some but not all displacement of existing product (per person expenditure on rice increases).
- The case where new products are high or perfect substitutes was not considered: it is difficult to justify a business case that involves direct competition in markets with a significantly larger competitor who also sells under Australian branding, as well as competing with suppliers from other countries.

Supply side characteristics

On the supply side, as part of the scenario for the breakaway group of Riverina/Murray producers, a key linkage included showed that the existing supply chain will have to readjust the configuration of their sales in line with a reduction in paddy availability. Further to its partial equilibrium attributes, the model does not explicitly capture:

- dynamics of production environment, through water allocations, or in domestic and export markets
- linkages between paddy and other crops through the competition for land and water — especially decision-making in response to variable allocations and water prices between years and within seasons
- linkages between the rice industry and wider NSW regions through investment, employment and the purchases of other inputs.

To better understand the flow-on impacts at farm and regional level, a critical component would be to understand changes in paddy pricing policies for each supply chain. This would require detailed knowledge of supply chain costs and charges — which were not made available — and how corporate decisions are made on both recovery of costs and transfer pricing from other business segments.

H Detailed modelling results

This appendix provides detailed results using the economic value-chain model, developed for this evaluation using the data and scenarios developed in appendix F. The quantification of deregulation scenarios in table 4.7 are combinations of the outcomes from appendix F that span the following dimensions:

- changes that result from improvements in domestic market access and both domestic and export market access
- Northern Rivers (only) and Murray/Riverina breakaway group (only) and then both groups combined (allowing for substitution effects between them in consumption)
- low and medium-substitution cases — noting that the medium substitution case is the headline analysis.

Based on these dimensions, a total 12 combinations were quantified that feed into the deregulation scenarios.

Impacts on supply chain sales volumes and prices

Tables H.1 and H.2 provide details on the impact of sales volumes and prices for each of the 12 combinations quantified for the year of maximum impact — 2026-27.

Table H.1 shows that on its own, the scenario for the expansion of the Northern Rivers region only, results in an increase in sales volumes that reflect their potential for expansion — but with minimal impact on the existing supply chain. For the headline analysis for increased access to both domestic and export markets, after accounting for changes in prices, for sales by the Northern Rivers region would expand by 13.2 kt, compared to the baseline, while sales by the existing supply chain would fall by -0.6 kt. For the Riverina/Murray region only, this impact has a largely impact (-20.4 kt) primarily as a result of loss of throughput for their supply chain. For the expansion in both regions, total sales increase by 34 kt but with a reduction in the existing supply chain of 19.8 kt. Note that these results may not add due to cross-price effects.

Table H.2 shows that prices are also impacted. For the same scenario, the new entrants will have to reduce the price of their product on average by .7 per cent to expand sales, however, the negative shift of the supply curve for the existing supply chain should result in a small increase in average price received of 1.6 per cent.

H.1 Impact of on volumes sold by existing and new supply chains^a

	Existing supply chain						New supply chains					
	Production	Domestic	New Zealand	Middle East	Japan	Other export countries	Total	Domestic	New Zealand	Middle East	Japan	Other export markets
	kt	kt	kt	kt	kt	kt	kt	kt	kt	kt	kt	kt
Increased domestic market access												
Low substitution												
Northern Rivers only	0.0	0.0	0.0	0.0	0.0	0.0	5.8	5.8	0.0	0.0	0.0	na
Riverina/Murray only	-5.4	-1.0	-0.2	-1.0	-0.7	-2.5	10.1	10.1	0.0	0.0	0.0	na
Both regions combined ^b	-2.5	-0.8	-0.2	-0.9	-0.6	0.0	12.3	12.3	0.0	0.0	0.0	na
Medium substitution												
Northern Rivers only	-0.3	-0.5	0.0	0.0	0.0	0.1	5.3	5.3	0.0	0.0	0.0	na
Riverina/Murray only	-6.0	-1.8	-0.2	-0.9	-0.6	-2.4	9.0	9.0	0.0	0.0	0.0	na
Both regions combined ^b	-5.4	-1.8	-0.2	-0.8	-0.6	-2.1	11.0	11.0	0.0	0.0	0.0	na
Domestic and export market liberalisation												
Low substitution												
Northern Rivers only	0.1	0.0	0.1	0.0	0.0	0.0	18.2	6.5	4.5	2.7	4.5	na
Riverina/Murray only	-19.4	-3.7	-0.7	-3.5	-2.4	-9.0	34.4	15.1	7.4	4.5	7.4	na
Both regions combined ^b	-18.6	-3.5	-0.6	-3.5	-2.3	-8.7	46.0	17.0	11.1	6.6	11.1	na
Medium substitution												
Northern Rivers only	-0.6	-0.6	-0.1	-0.1	0.0	0.2	13.2	5.9	4.0	2.4	0.8	na
Riverina/Murray only	-20.4	-4.7	-1.0	-3.7	-2.4	-8.7	26.6	13.4	6.5	4.0	2.7	na
Both regions combined ^b	-19.8	-4.5	-0.9	-3.6	-2.3	-8.4	34.0	15.0	9.7	6.0	3.3	na

^a Change from base for the crop year 2026-27. Changes in sales in product weight. ^b Result for combined regions is not the sum of each region due to cross-price effects.

Source: CIE.

H.2 Impact of on prices received by existing and new supply chains^a

	Existing supply chain						New supply chains				
	Total	Domestic	New Zealand	Middle East	Japan	Other export countries	Domestic	New Zealand	Middle East	Japan	Other export markets
	%	%	%	%	%	%	%	%	%	%	%
Increased domestic market access											
Low substitution											
Northern Rivers only	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	na
Riverina/Murray only	0.6	0.7	0.7	0.7	0.4	0.6	0.4	0.4	0.4	0.1	na
Both regions combined ^b	0.5	0.7	0.6	0.6	0.4	0.5	0.3	0.3	0.3	0.0	na
Medium substitution											
Northern Rivers only	-0.2	-0.4	0.0	0.0	0.0	0.0	-5.6	0.0	0.0	0.0	na
Riverina/Murray only	0.4	0.1	0.7	0.7	0.4	0.4	-7.4	0.3	0.3	0.1	na
Both regions combined ^b	0.3	0.0	0.6	0.6	0.3	0.3	-8.3	0.3	0.3	0.0	na
Domestic and export market liberalisation											
Low substitution											
Northern Rivers only	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	na
Riverina/Murray only	2.0	2.5	2.8	2.5	1.6	1.4	1.3	1.4	1.3	0.2	na
Both regions combined ^b	2.0	2.5	3.1	2.4	1.5	1.4	1.2	1.7	1.2	0.2	na
Medium substitution											
Northern Rivers only	-0.1	-0.4	-0.3	-0.1	0.0	0.0	-6.0	-11.5	-10.1	-9.9	na
Riverina/Murray only	1.7	1.7	2.0	2.3	1.5	1.4	-8.1	-11.2	-9.1	-9.8	na
Both regions combined ^b	1.6	1.6	2.0	2.2	1.4	1.3	-8.7	-12.0	-9.3	-9.8	na

^a Change from base for the crop year 2026-27, milled rice prices by market at export fob equivalent level. ^b Result for combined regions is not the sum of each region due to cross-price effects.

Source: CIE.

Impacts on sales value and markets

Access to the domestic market

As noted, the emerging production groups do not have access to export markets and compete with existing product in the market —both NSW and imported US rice. Table H.3 provides the outcomes for sales by market for the Northern Rivers industry only and the 2026-27 crop year (the maximum impact year).

Additional production from Northern Rivers producers has the potential to displace a small amount of the sales by the existing supply chain — which has to either adjust production or divert this product to another market. Given the scale of the Northern Rivers industry, this additional product will represent less than 2 per cent of the domestic market in volume terms. In the moderate substitution case, the total value of domestic sales by the Northern Rivers group could expand by \$10.6 million with negligible impact on the established supply chain.

H.3 Impacts of Northern Rivers only — domestic market ^a

		Low Substitution	Moderate substitution
Change in sales value			
Existing supply chain	\$Am	0.0	-1.2
Northern Rivers	\$Am	10.6	8.7
—Total New South Wales	\$Am	10.6	7.6
Change in consumer expenditure			
Quantity	%	6.0	4.2
Price	%	0.0	-0.7
Value	%	6.0	3.4

^a Change from base for the crop year 2026-27. Sales valued at import equivalent level in each market valued in Australian dollars.
Source: CIE.

The impact for the Murray/Riverina group is different to the Northern Rivers as the new product supplied is the result of diversion of rice that would otherwise be sold through the Grower's Pool.

The low substitution case involves the smallest reduction in sales for the existing supply chain as expenditure in the domestic market grows to accommodate the new product (see table H.4). Even though the new product is assumed to sell at a premium to the existing supply chain, the difference is not substantial in dollar terms. For the moderate case, there is an overall improvement in the value of sale across NSW rice of \$10.9 million.

H.4 Impacts of the Riverina/Murray breakaway group only – domestic market ^a

		Low Substitution	Moderate substitution
Change in sales value			
Existing supply chain	\$Am	-2.0	-3.9
Breakaway Riverina/Murray group	\$Am	18.4	14.8
– Total New South Wales	\$Am	16.4	10.9
Change in consumer expenditure			
Quantity	%	7.9	5.4
Price	%	0.7	-0.6
Value	%	8.6	4.8

^a Change from base for the crop year 2026-27. Sales valued at import equivalent level in each market valued in Australian dollars.
Source: CIE.

The total result across the new supply chains, shown in table H.5, provide a similar outcome — in terms of the value sales, there is an opportunity to increase the sales of NSW rice on the domestic market given that the new product is not a strong substitute. In total, sales of NSW rice on the domestic market could increase by \$14 million in 2026-27 or equivalent to an 8.2 per cent increase in expenditure.

H.5 Both regions combined – domestic market ^a

		Low Substitution	Moderate substitution
Change in sale value			
Existing supply chain	\$Am	-1.7	-3.8
Northern Rivers and breakaway Riverina/Murray group	\$Am	22.5	17.8
– Total New South Wales	\$Am	20.8	14.0
Change in consumer expenditure			
Quantity	%	12.7	8.2
Price	%	0.6	-0.8
Value	%	13.4	7.3

^a Change from base for the crop year 2026-27. Sales valued at export equivalent level in each market valued in Australian dollars. Northern Rivers region plus Riverina/Murray breakaway group. Result for combined regions is not the sum of each region due to cross-price effects.
Source: CIE.

Access to domestic and export markets

Improved access to the domestic market in addition to exports, provides greater opportunities for expansion in terms of more growers in Northern Rivers region and the opportunity for more growers to move to a new supply chain in the southern region.

Table H.6 shows the outcomes by market grouping for the case where the Northern Rivers can export to both domestic and export markets — and follows a similar logic to the scenario that improves access to the domestic market.

In the moderate substitution case, there is scope to increase the overall value of sales across the NSW industry by increasing the market options for the Northern Rivers supply chain by \$21.1 million in 2026-27 offset by a small reduction for the existing supply chain for an overall gain of \$19.3 million as a result of increased competition in the targeted markets.

H.6 Impacts of Northern Rivers only – domestic and export markets ^a

		Total	Domestic	New Zealand	Middle East	Japan
Low substitution case						
Change in sale value						
Existing supply chain	\$Am	0.3	0.0	0.1	0.0	0.0
Northern Rivers	\$Am	26.1	4.5	4.9	2.7	0.9
– Total New South Wales	\$Am	26.4	4.5	5.0	2.7	0.9
Change in consumer expenditure						
Quantity	%		6.7	21.1	2.4	0.3
Price	%		0.0	0.4	0.0	0.0
Value	%		6.8	21.6	2.4	0.3
Moderate substitution case						
Change in sale value						
Southern supply chain	\$m	-1.8	-1.4	-0.2	-0.3	0.0
Northern Rivers	\$m	21.1	9.6	6.5	3.7	1.2
– Total New South Wales	\$m	19.3	8.3	6.2	3.4	1.3
Change in consumer expenditure						
Quantity	%		4.7	12.4	1.4	0.2
Price	%		-0.8	-0.9	-0.2	0.0
Value	%		3.8	11.4	1.2	0.2

^a Change from base for the crop year 2026-27. Sales valued at wholesale level in each market valued in Australian dollars.
Source: CIE.

This is a substantial improvement over the domestic-only cases, as a result of the higher levels of production and diversifying the impact of additional sales across more markets.

Table H.7 provides the equivalent outcome for the Riverina/Murray breakaway group.

H.7 Riverina/Murray breakaway group only – domestic and export markets^a

		Total	Domestic	New Zealand	Middle East	Japan
Low substitution case						
Change in sale value						
Existing supply chain	\$Am	-7.2	-2.6	-0.4	-2.3	-2.0
Riverina/Murray breakaway	\$Am	54.2	27.8	13.7	7.6	5.0

		Total	Domestic	New Zealand	Middle East	Japan
– Total New South Wales	\$Am	46.9	25.2	13.4	5.4	3.0
Change in consumer expenditure						
Quantity	%		10.0	29.2	1.9	0.7
Price	%		2.2	2.8	2.0	0.3
Value	%		12.4	32.8	3.9	1.0
Moderate substitution case						
Change in sale value						
Southern supply chain	\$m	-10.8	-5.1	-0.9	-2.7	-2.0
Riverina/Murray Breakaway group	\$m	42.7	21.9	10.6	6.2	4.1
– Total New South Wales	\$m	31.9	16.8	9.6	3.4	2.1
Change in consumer expenditure						
Quantity	%		5.9	16.3	0.3	0.3
Price	%		0.5	0.6	1.6	0.2
Value	%		6.5	17.0	1.9	0.5

^a Change from base for the crop year 2026-27. Sales valued at wholesale level in each market valued in Australian dollars.
Source: CIE.

In the moderate case, the total increase in sales could be \$31.9 million made up of total sales increase of \$54.2 million for the new entrants and a reduction in the existing supply chain of \$10.5 million. The losses to the existing supply chain are primarily incurred by the loss of throughput in the Growers' pool that can be sold across all markets. Product displaced from the target markets are diverted to secondary export markets.

The total impacts across markets for both the new supply chains are shown in the H.8. The moderate substitution case is the headline results for this evaluation. Also, note that the totals do not equal the sum of the components because of cross-impacts between all NSW rice supply chains.

With access to domestic and export markets in the headline analysis, total sales of NSW rice could increase by \$54.2 million higher relative to the baseline for 2026-27 after accounting for the diversion of product from the Grower' pool and price effects, the total value of sales could increase by \$43.7million for 2026-27.

H.8 Total impacts for deregulation across domestic and export markets ^a

		Total	Domestic	New Zealand	Middle East	Japan
Low substitution case						
Change in sale value						
Existing supply chain	\$Am	-4.5	-24.1	-4.9	18.3	6.1
Northern Rivers and breakaway Riverina/Murray groups	\$Am	69.6	31.4	20.6	11.4	6.2
– Total New South Wales	\$Am	65.1	7.3	15.7	29.7	12.3
Change in consumer expenditure						

		Total	Domestic	New Zealand	Middle East	Japan
Quantity	%		15.4	43.5	3.8	0.9
Price	%		2.2	3.3	1.8	0.3
Value	%		17.9	48.3	5.7	1.2
Moderate substitution case						
Change in sale value						
Southern supply chain	\$m	-10.5	-4.9	-0.9	-2.7	-1.9
Northern Rivers and breakaway Riverina/Murray groups	\$m	54.2	24.4	15.5	9.2	5.1
—Total New South Wales	\$m	43.7	19.5	14.7	6.4	3.1
Change in consumer expenditure						
Quantity	%		8.9	25.3	1.4	0.4
Price	%		0.4	0.1	1.4	0.2
Value	%		9.4	25.4	2.9	0.6

^a Change from base for the crop year 2026-27. The sum of Northern and Riverina/Murray region. Sales valued at wholesale level in each market valued in Australian dollars. Result for combined regions is not the sum of each region due to cross-price effects.

Source: CIE.

Impact on value of sales

Using the economic model, the changes in sales by market were calculated back to outcomes at an export fob level for NSW rice.

- In the case of the domestic market, this was equivalent to wholesale values.
- Following Treasury Guidelines, the net present value of the total sales across domestic and export markets are calculated at a rate of 7 per cent.

These sales are the total available from which milling and marketing costs are deducted — and the payment to growers.

Table H.9 shows the outcomes for potential impacts of greater access to the domestic market for the new marketing groups.

In the most likely case, the NPV of the total change in the value of sales across NSW supply chain — for the domestic market only — is \$42.4 million over 6 years after accounting for the impact on the existing supply chain. This is a 2.1 per cent improvement relative to the baseline.

H.9 Impact of the value of sales – domestic market only^a

Year	Low substitution			Moderate substitution		
	Existing supply chain	Market entrants	Total	Existing supply chain	Market entrants	Total
	\$Am	\$Am	\$Am	\$Am	\$Am	
Northern Rivers only						
Net present value	0.0	17.8	17.9	-2.6	14.3	11.7
2020-21	0.0	0.0	0.0	0.0	0.0	0.0
2021-22	0.0	0.0	0.0	0.0	0.0	0.0
2022-23	0.0	1.4	1.4	-0.2	1.2	0.9
2023-24	0.1	3.0	3.0	-0.5	2.4	1.9
2024-25	0.0	4.7	4.7	-0.8	3.8	3.1
2025-26	0.0	6.6	6.7	-0.9	5.3	4.4
2026-27	0.0	8.7	8.7	-1.1	6.9	5.8
Riverina/Murray Breakaway group only						
Net present value	-20.1	72.6	52.5	-27.1	57.6	30.5
2020-21	0.0	0.0	0.0	0.0	0.0	0.0
2021-22	-4.5	13.1	8.6	-5.7	10.2	4.5
2022-23	-4.2	14.0	9.8	-5.6	11.1	5.5
2023-24	-4.1	14.9	10.8	-5.6	11.8	6.3
2024-25	-4.2	15.9	11.7	-5.7	12.7	7.0
2025-26	-4.2	16.8	12.7	-5.8	13.5	7.7
2026-27	-4.2	17.8	13.6	-5.9	14.3	8.4
Northern Rivers and breakaway Riverina/Murray groups combined^b						
Net present value	-27.1	57.6	30.5	-29.6	71.9	42.4
2020-21	0.0	0.0	0.0	0.0	0.0	0.0
2021-22	-5.7	10.2	4.5	-5.7	10.2	4.5
2022-23	-5.6	11.1	5.5	-5.5	11.1	5.6
2023-24	-5.6	11.8	6.3	-5.5	12.1	6.6
2024-25	-5.7	12.7	7.0	-5.5	13.2	7.7
2025-26	-5.8	13.5	7.7	-5.5	14.4	8.9
2026-27	-5.9	14.3	8.4	-5.5	15.7	10.2

^a Change from baseline. Sales valued at export equivalent level valued in Australian dollars. The present value calculation uses a discount rate of 7 per cent. ^b Result for combined regions is not the sum of each region due to cross-price effects.

Source: CIE.

Table H.10 shows the equivalent scenarios for improved access to both domestic and export markets. In the moderate substitution case, the NPV of the total change in the value of sales across NSW supply chain — for improved access to the domestic and export markets — is \$81.5 million over 6 years — or 4 per cent improvement in the value of sale relative to the baseline.

H.10 Impact of the value of sales – domestic and export markets^a

Year	Low substitution			Moderate substitution		
	Existing supply chain	Market entrants	Total	Existing supply chain	Market entrants	Total
	\$Am	\$Am	\$Am	\$Am	\$Am	
Northern Rivers only						
Net present value	0.3	47.2	47.5	-4.2	37.4	33.2
2020-21	0.0	0.0	0.0	0.0	0.0	0.0
2021-22	0.0	0.3	0.3	-0.1	0.3	0.2
2022-23	0.1	3.8	3.9	-0.5	3.1	2.6
2023-24	0.0	7.9	7.9	-0.8	6.4	5.5
2024-25	0.1	12.8	12.8	-1.2	10.1	8.9
2025-26	0.0	17.1	17.1	-1.4	13.5	12.1
2026-27	0.3	22.7	23.0	-1.6	17.8	16.2
Riverina/Murray Breakaway group only						
Net present value	-46.5	153.2	106.7	-57.1	119.4	62.4
2020-21	0.0	0.0	0.0	0.0	0.0	0.0
2021-22	-5.1	14.7	9.7	-6.3	11.4	5.1
2022-23	-6.7	21.4	14.8	-8.4	16.8	8.4
2023-24	-8.6	28.8	20.1	-10.8	22.5	11.8
2024-25	-10.8	36.8	26.0	-13.5	28.7	15.3
2025-26	-14.9	49.6	34.7	-17.8	38.5	20.7
2026-27	-15.0	50.7	35.8	-18.2	39.5	21.3
Northern Rivers and breakaway Riverina/Murray groups combined^b						
Net present value	-44.8	178.9	134.2	-56.1	137.6	81.5
2020-21	0.0	0.0	0.0	0.0	0.0	0.0
2021-22	-5.1	15.1	10.0	-6.3	11.7	5.4
2022-23	-6.5	23.6	17.1	-8.4	18.4	9.9
2023-24	-8.3	33.1	24.8	-10.6	25.6	15.1
2024-25	-10.5	43.7	33.2	-13.1	33.6	20.5
2025-26	-14.2	58.5	44.3	-17.5	44.7	27.2
2026-27	-14.2	63.4	49.1	-17.6	48.3	30.6

^a Change from baseline. Sales valued at export equivalent level valued in Australian dollars. The present value calculation uses a discount rate of 7 per cent.. ^b Result for combined regions is not the sum of each region due to cross-price effects.

Source: CIE.

Key insights from these results

The scenarios developed for this evaluation are conservative given the uncertainty around the potential of the new supply chains to develop in a deregulated environment

and given the variability in market conditions both at farm level and across potential markets. The key drivers of these results recognise that:

- the potential Northern Rivers production area is relatively modest compared to the scale of the industry in the Riverina/Murray region — especially considering the relatively conservative approach taken to the production potential for this region over the timeframe considered
 - However, rice has the potential to provide a crop with a high gross margin per hectare, relative to soybeans and corn, and provides another option to increase utilisation of cropping and grazing land.
- businesses who choose to leave the Grower’s pool will do so because they believe they can receive higher returns from improved branding and marketing of their own product — compared to the current supply chain.
 - However, the benefit to the region largely depends on the extent of the premiums that they can earn over the existing pool price offer.
 - If growers didn’t believe that they could not match the returns and costs of existing supply chain — it is unlikely that they would leave the established supply chain.
- for the existing supply chains in the Riverina/Murray region, the loss of throughput and pool sales will reduce revenue across all markets in the first instance and then in relation to the additional competition faces in each of the export markets identified.

It is noted that the impacts on the existing supply chain in each case are small — compared the market variation that has been observed in both the ricegrowing sector historically and across each of the markets. In fact, in response to this variation, the existing supply chain has already adapted its marketing strategy and diversified its corporate base.

Summary of impact on export prices

The final step is to map the outcomes identified to the options for evaluation. Table H.11 shows the summary for the best case for new supply chains — where their products are highly differentiated from existing product on the market. Benefits under option 2 could be as high as \$134.2 million in NPV terms over a 6-year period. If the Northern Rivers region was excluded from the current arrangements, the equivalent benefit would be \$47.5 million.

H.11 Impact on value of sales — low substitution with existing product

	Existing supply chains	Expansion of existing and new supply chain	Total
	\$Am	\$Am	\$Am
Scenario 1b			
Northern Rivers only	0.0	17.8	17.9
Riverina/Murray only	-20.1	72.6	52.5
Both regions combined ^b	-20.0	90.4	70.3

	Existing supply chains	Expansion of existing and new supply chain	Total
	\$Am	\$Am	\$Am
Scenario 2			
Northern Rivers only	0.3	47.2	47.5
Riverina/Murray only	-46.5	153.2	106.7
Both regions combined ^b	-44.8	178.9	134.2
Scenario 3			
Northern Rivers only	-20.1	72.6	52.5
Riverina/Murray only	0.3	47.2	47.5
Both regions combined ^b	-19.8	119.8	100.0

^a Net present value of domestic and export sales over the period 2020-21 to 2026-27 using a discount rate of 7 per cent. ^b Result for combined regions is not the sum of each region due to cross-price effects.

Source: Appendix HG.

For the headline analysis for this evaluation — a more conservative approach is taken based on a moderate level of substitution between the new and existing supply chains.

H.12 Impact on value of sales — moderate substitution

	Existing supply chains	Expansion of existing and new supply chain	Total
	\$Am	\$Am	\$Am
Scenario 1b			
Northern Rivers only	-2.4	14.3	11.9
Riverina/Murray only	-27.1	57.6	30.5
Both regions combined ^b	-29.6	71.9	42.4
Scenario 2			
Northern Rivers only	-4.2	37.4	33.2
Riverina/Murray only	-57.1	119.4	62.4
Both regions combined ^b	-56.1	137.6	81.5
Scenario 3			
Northern Rivers only	-27.1	57.6	30.5
Riverina/Murray only	-4.2	37.4	33.2
Both regions combined ^b	-31.3	95.0	63.7

^a Net present value of domestic and export sales over the period 2020-21 to 2026-27 using a discount rate of 7 per cent. ^b Result for combined regions is not the sum of each region due to cross-price effects.

Source: Appendix H.

These total benefits remain substantial — for scenario 2, the increase in total sales in present value terms falls from \$134.2 to \$81.5 million.

Impact on FSA

Given the reliance on the RMB growers report for baseline benefits, changes from baseline need to be estimated — the major impact being for scenario 2. In terms of the outcomes of the economic model for export volumes:

- the case where the Northern Rivers producers can export will not directly impact on the existing baseline FSA benefits but indirectly through interactions in each market, however
- the breakaway group in the Riverina/Murray will directly reduce total sales volumes for the existing supply chain and in directly through market competition.

In the absence of better information from industry, an approach was taken that reflects the nature of these benefits for the existing supply chain.

- Lower freight volumes result in a lower benefit when the per tonne savings are held constant.
- In addition, the per tonne advantage is also reduced in line with lower export volumes by market grouping used in the RMB analysis.

Three variations were considered where exports volumes by the existing supply chain were reduced by:

- maximum or first round export volumes by both the Northern Rivers and the Riverina/Murray Breakaway group — which amounts to a total of 22.8 kt by 2026-27 across New Zealand, the Middle East and Japan (that is, these exports displace those from the existing supply chain)
- the export volumes indicated by the economic modelling under the moderate substitution case that fall by 6.7 kt for scenario 2 and 1.6 kt for scenario 3.

To approximate how these changes could work in practice, it was assumed that for every 1 per cent reduction in the volume exported to each market grouping, compared to baseline, the per tonne advantage would fall by a greater proportion:

- a factor of 2 per cent was used on low-cost routes — New Zealand and for Japan
- a factor of 3 per cent was used for the Middle East.

In the case of exports to the Pacific Majors and the Pacific export groupings, there was no change in the FSA rates.

Table **Error! Reference source not found.** shows that per tonne FSA between the baseline and scenarios 2 and 3 —does not change for routes where the new entrants are unlikely to export. In the case of the maximum impact for the existing supply chain, the average per tonne FSA advantage by 2027 could fall from an average of \$23.53 per tonne to \$21.31 per tonne — a reduction of 9.4 per cent.

H.13 Freight scale advantage by market grouping

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Source: RMB, SunRice and CIE.

In the case of the most- likely impact for the existing supply chain based on the diversion of lower volumes, the average per tonne FSA advantage could fall to \$22.76 per tonne — a reduction of 5.4 per cent.

Tables H.14 and H.15 shows that given these assumptions, the change in benefits identified by the RMB Grower’s report are likely to be small.

H.14 Maximum reduction of FSA for existing supply chain^a

		NPV ^a	2020	2021	2022	2023	2024	2025	2026
Average FSA rate									
Baseline	\$/t		17.56	28.25	24.94	24.28	22.85	23.53	23.53
Scenario 2	\$/t		17.56	28.25	24.64	23.69	21.67	21.53	21.31
– Change from baseline	\$/t		0.0	0.0	-0.3	-0.6	-1.2	-2.0	-2.2
Total export volumes									
Baseline	kt		24.8	110.7	207.1	268.9	248.2	236.7	236.7
Scenario 2	kt		24.8	110.7	205.1	263.7	238.4	218.3	213.9
– Change from baseline	kt		0.0	0.0	-2.0	-5.2	-9.8	-18.4	-22.8
Value of FSA									
Baseline	\$m	25.21	0.44	3.13	5.17	6.53	5.67	5.57	5.57
Scenario 2	\$m	23.20	0.44	3.13	5.05	6.25	5.17	4.70	4.56
– change from baseline	\$m	-2.01	0.00	0.00	-0.11	-0.28	-0.51	-0.87	-1.01

^a Net present value of domestic and export sales over the period 2020-21 to 2026-27 using a discount rate of 7 per cent.

Source: RMB and CIE calculations.

In the case of the maximum reduction in export volumes, the total value of FSA in 2026-27 for the existing supply chain will fall from \$5.57 to \$ 4.56 million — a reduction of -\$1.01 million or 18.2 per cent. For scenario and the most likely substitution case, shown in table H.15, the total value of FSA in 2026-27 for the existing supply chain will fall from \$5.57 to \$ 5.12 million — a reduction of \$0.44 million or 8 per cent.

H.15 Most likely reduction of FSA for existing supply chain under scenario 2^a

		NPV ^a	2020	2021	2022	2023	2024	2025	2026
Average FSA rate									
Baseline	\$/t		17.56	28.25	24.94	24.28	22.85	23.53	23.53
Scenario 2	\$/t		17.56	27.61	24.37	23.68	22.01	22.31	22.30
– Change from baseline	\$/t		0.0	-0.6	-0.6	-0.6	-0.8	-1.2	-1.2
Total export volumes									
Baseline	kt		24.8	110.7	207.1	268.9	248.2	236.7	236.7
Scenario 2	kt		24.8	108.6	204.2	265.0	243.3	229.9	229.9
– Change from baseline	kt		0.0	-2.2	-2.9	-3.9	-4.9	-6.8	-6.8

		NPV ^a	2020	2021	2022	2023	2024	2025	2026
Value of FSA									
Baseline	\$m	25.21	0.44	3.13	5.17	6.53	5.67	5.57	5.57
Scenario 2	\$m	23.86	0.44	3.00	4.98	6.27	5.36	5.13	5.12
– change from baseline	\$m	-1.35	0.00	-0.13	-0.19	-0.26	-0.32	-0.44	-0.44

^a Net present value of domestic and export sales over the period 2020-21 to 2026-27 using a discount rate of 7 per cent.

Source: RMB and CIE calculations.

Similarly, for scenario 3 where the single desk is retained in the southern region, the losses are expected to be significantly smaller (see table H.16).

H.16 Most likely reduction of FSA for existing supply chain under scenario 3^a

		NPV ^a	2020	2021	2022	2023	2024	2025	2026
Average FSA rate									
Baseline	\$/t		17.56	28.25	24.94	24.28	22.85	23.53	23.53
Scenario 3	\$/t		17.56	27.68	24.59	24.01	22.56	23.24	23.25
– Change from baseline	\$/t		0.0	-0.6	-0.3	-0.3	-0.3	-0.3	-0.3
Total export volumes									
Baseline	kt		24.8	110.7	207.1	268.9	248.2	236.7	236.7
Scenario 3	kt		24.8	108.8	205.4	267.2	246.6	235.1	235.1
– Change from baseline	kt		0.0	-1.9	-1.8	-1.7	-1.7	-1.6	-1.6
Value of FSA									
Baseline	\$m	25.21	0.44	3.13	5.17	6.53	5.67	5.57	5.57
Scenario 3	\$m	24.68	0.44	3.01	5.05	6.42	5.56	5.46	5.47
– change from baseline	\$m	-0.53	0.00	-0.12	-0.12	-0.11	-0.11	-0.11	-0.10

^a Net present value of domestic and export sales over the period 2020-21 to 2026-27 using a discount rate of 7 per cent.

Source: RMB and CIE calculations.

In present value terms these impacts over the seven years between 2020-21 to 2026-07 range from to -\$1.35 to -\$0.53 million.



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