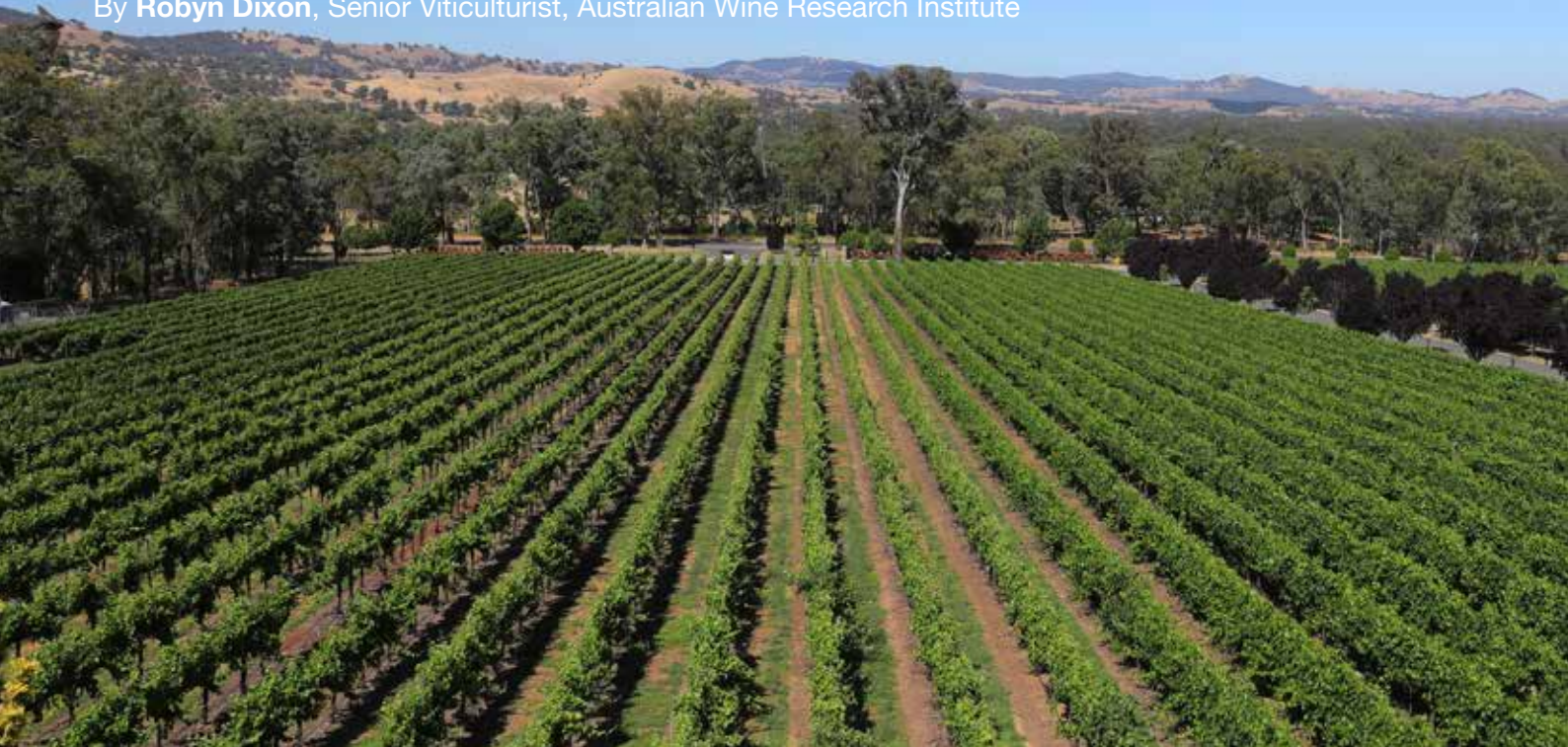


Understanding the costs and benefits of producing a wine-grape crop in low market demand years

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The wine industry, like all primary production, is sensitive to fluctuations in market supply and demand, and the industry is currently in an oversupply position in a number of key wine growing regions across Australia. This article presents a cost-benefit analysis of a range of scenarios (in a hot and a cool wine growing region) for producing a wine-grape crop, to assist growers in making informed production decisions. The analysis evaluates the economic feasibility of maintaining vineyards during periods of reduced demand and provides insights into strategic decision-making for growers.

Introduction

The global wine industry stands out for its sensitivity to fluctuations in grape and wine supply and demand. Vineyard owners and winemakers perpetually grapple with the challenge of deciding whether or not to proceed with grape crop production during periods of low market demand. In scenarios where grape production becomes economically unfeasible, growers confront a series of complex choices: Should they opt to rest the vineyard, biding their time in the hope of improved conditions? Should they contemplate changing the grape variety to one where demand may be higher? This article considers the cost-benefit dynamics associated with

these scenarios and pivotal decisions. It takes into account a myriad of factors, including prevailing market conditions and the long-term strategic implications of each choice. Six distinct scenarios are covered:

Scenario 1: Continuing with the status quo with a grape supply contract.

This option involves maintaining the current grape variety and production levels under an existing contract.

Scenario 2: Continuing with the status quo without a grape supply contract.

Here, growers persist with the present grape variety and production levels, but without the security of a contract.

Scenario 3: Resting the block.

This strategy involves managing the vineyard to minimise fruit production for a period of time and reduce costs where possible. In this scenario the plant growth regulator ethephon is used at early fruit set to heavily reduce yield. Resting the vineyard for the duration of the low-demand situation allows growers to reduce vineyard management costs until the market improves. In this study, the blocks were rested for five years and then returned to full production.

Scenario 4: Reworking.

Here, the existing cordon within a vineyard is removed and replaced with a new cordon that has been trained up

Disclaimer: This article seeks to provide information regarding factors growers should consider when conducting a cost/benefit analysis for their own business. It is up to each producer to seek out numbers that reflect their specific circumstances and make their own informed business decisions.

from a watershoot originating from the old vine. This option halts production for one year. This pause also serves to rejuvenate the vine by eliminating any trunk disease or dead wood. When done effectively, this approach can significantly enhance vine longevity and overall productivity. However, once the vines return to production, the growers are left with the same variety, which may still be subject to the same constraints.

Scenario 5: Grafting to another variety.

Under this option the vineyard's existing vines are grafted/top-worked to a new grape variety, maintaining the rootstock and offering an option for diversification and adaptation to market demand.

Scenario 6: Replanting to another variety.

This involves a comprehensive overhaul of the vineyard where existing vines, trellis, and drip line are replaced and the vineyard is replanted with a different grape variety.

Each of these scenarios is examined in a warm and cool grape growing region, providing insights into the financial and strategic factors for producers to consider. The analysis provides guidance for vineyard owners and winemakers facing these challenges, facilitating informed choices to navigate the ever-evolving landscape of the wine industry.

How was the cost-benefit analysis done?

To conduct a comprehensive cost-benefit analysis, data were collected from multiple sources, including historical grape yield data, market trends, production cost estimates and expert opinions. These data were used to create two representative case studies for analysis. The case studies were based on a Shiraz block with 3 m row spacing, 2 m vine spacing and 1,667 vines per hectare in two different regions – a warm region (Region 1) and a cooler region (Region 2). In these case studies, we assumed that the period of reduced demand would persist for a duration of five years. Subsequently, we projected that grape prices would revert to the district average levels observed in the five years preceding the low-demand scenario unless the variety was changed, then it would revert to the five-year average price per tonne and target tonnes of the new variety. The

grape prices used in the analysis are anecdotal and should not be considered a prediction of future grape prices. For the case studies, a potential new variety was identified for each region based on an increase in demand and a stable price. Growers who choose to mitigate the low demand situation by grafting to an 'in-demand' variety are advised to do so only if they have a secure contract for the new variety. There may be opportunities for growers who have good relationships with their purchasing winery to change varieties. However, if a grower chooses to change varieties without a contract, the risk is that they won't be able to sell the new variety either and they will be left with a grafting/replanting bill. In the current situation, there is no 'silver bullet' variety with sufficient demand to soak up the production of all the hectares of vineyard that are in a low-demand situation.

When faced with a situation where crop production is unviable, growers are forced to make tough decisions about how they manage their blocks in the short and long term.

Fixed and variable costs associated with Shiraz wine-grape production in each region were identified and analysed. Fixed costs encompassed council rates, equipment, and infrastructure maintenance, fixed labour costs (vineyard and irrigation management), and irrigation water connection fees and access charges. Variable costs included inputs such as fertilisers, pesticides, fungicides, herbicides, variable labour costs, fuel and electricity. Cost estimates were adjusted for inflation at a 3% per annum rate, being the top of the Reserve Bank of Australia inflation target range of 2-3% and region-specific factors. Benefits were assessed in terms of revenue generated from grape sales (Wine Australia 2023).

Market conditions, including grape prices and demand forecasts, were considered to estimate potential revenues during low-demand years (Hathaway 2023). Details of the cost-benefit analysis for each scenario are summarised in Tables 1 (page 40) and 2 (page 42).

How did the fixed costs, variable costs, and profit/loss vary across the different scenarios?

Fixed costs

Each year, regardless of the supply and demand conditions, vineyard owners incur fixed costs to maintain their vineyards. In this study, fixed costs accounted for approximately 33% to 35% of the total production costs (Tables 1 and 2). These fixed costs were incurred regardless of whether a crop was produced or not.

Variable costs

Variable costs are those associated with vineyard inputs and operations and these varied dramatically depending on the scenario. Under both crop production scenarios, variable costs constituted 65% to 67% of the overall production costs. Among these variable costs, fuel and labour expenses associated with vineyard operations, particularly activities such as harvest and pruning, were the most significant contributors (data not shown).

By resting vineyards, the variable costs associated with maintaining a block were reduced by 58%-66% by reducing or eliminating vineyard operations such as wire lifting, trimming, slashing, cultivation, fungicide applications, herbicide applications pruning and harvesting (data not shown).

The costs associated with reworking, grafting and replanting a block were significant in the first year. On average, reworking costs were approximately \$9,000 per hectare in the first year and \$3,000 per hectare in the second year on top of the variable and fixed costs. The reworking costs include chain sawing vines, removing and replacing the fruiting wire, installing a foliage wire and vine training. Yields are expected to take five years to get back to full production after reworking, with vines producing 0% of the full crop in the first year, 30% in the second, 60% in the third, 90% in the fourth and 100% by the fifth year.

Table 1 Expected costs, income and profit/loss associated with the different scenarios in Region 1 (warm) over ten years

Produce Shiraz crop with contract	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total costs (\$/ha)	\$6,157	\$6,342	\$6,527	\$6,711	\$6,896	\$7,081	\$7,265	\$7,450	\$7,635	\$7,820
Target yield (% of full production)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	12.00	12.00	12.00	12.00	12.00	16.00	16.00	16.00	16.00	16.00
Expected grape price (\$/t)	\$200	\$200	\$200	\$200	\$200	\$487	\$487	\$487	\$487	\$487
Expected income (\$/ha)	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$7,792	\$7,792	\$7,792	\$7,792	\$7,792
Profit/loss (\$/ha)	-\$3,757	-\$3,942	-\$4,127	-\$4,311	-\$4,496	\$711	\$527	\$342	\$157	-\$28
Cumulative profit/loss (\$/ha)	-\$3,757	-\$7,699	-\$11,826	-\$16,137	-\$20,633	-\$19,922	-\$19,395	-\$19,053	-\$18,896	-\$18,924
Produce Shiraz crop without contract	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total costs (\$/ha)	\$6,157	\$6,342	\$6,527	\$6,711	\$6,896	\$7,081	\$7,265	\$7,450	\$7,635	\$7,820
Target yield (% of full production)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	0.00	0.00	0.00	0.00	16.00	16.00	16.00	16.00	16.00
Expected grape price (\$/t)	\$200	\$200	\$200	\$200	\$200	\$487	\$487	\$487	\$487	\$487
Expected income (\$/ha)	\$0	\$0	\$0	\$0	\$0	\$7,792	\$7,792	\$7,792	\$7,792	\$7,792
Profit/loss (\$/ha)	-\$6,157	-\$6,342	-\$6,527	-\$6,711	-\$6,896	\$711	\$527	\$342	\$157	-\$28
Cumulative profit/loss (\$/ha)	-\$6,157	-\$12,499	-\$19,026	-\$25,737	-\$32,633	-\$31,922	-\$31,395	-\$31,053	-\$30,896	-\$30,924
Rest vineyard	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total costs (\$/ha)	\$3,796	\$3,906	\$4,017	\$4,128	\$4,238	\$7,081	\$7,265	\$7,450	\$7,635	\$7,820
Target yield (% of full production)	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	0.00	0.00	0.00	0.00	16.00	16.00	16.00	16.00	16.00
Expected grape price (\$/t)	\$200	\$200	\$200	\$200	\$200	\$487	\$487	\$487	\$487	\$487
Expected income (\$/ha)	\$0	\$0	\$0	\$0	\$0	\$7,792	\$7,792	\$7,792	\$7,792	\$7,792
Profit/loss (\$/ha)	-\$3,796	-\$3,906	-\$4,017	-\$4,128	-\$4,238	\$711	\$527	\$342	\$157	-\$28
Cumulative profit/loss (\$/ha)	-\$3,796	-\$7,702	-\$11,719	-\$15,847	-\$20,085	-\$19,373	-\$18,847	-\$18,505	-\$18,348	-\$18,375
Rework without contract	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total costs (\$/ha)	\$12,562	\$9,775	\$6,527	\$6,711	\$6,896	\$7,081	\$7,265	\$7,450	\$7,635	\$7,820
Target yield (% of full production)	0%	30%	60%	90%	100%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	0.00	0.00	0.00	0.00	16.00	16.00	16.00	16.00	16.00
Expected grape price (\$/t)	\$200	\$200	\$200	\$200	\$200	\$487	\$487	\$487	\$487	\$487
Expected income (\$/ha)	\$0	\$0	\$0	\$0	\$0	\$7,792	\$7,792	\$7,792	\$7,792	\$7,792
Profit/loss (\$/ha)	-\$12,562	-\$9,775	-\$6,527	-\$6,711	-\$6,896	\$711	\$527	\$342	\$157	-\$28
Cumulative profit/loss (\$/ha)	-\$12,562	-\$22,338	-\$28,864	-\$35,576	-\$42,472	-\$41,760	-\$41,234	-\$40,892	-\$40,735	-\$40,762
Graft to an in-demand variety	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total Costs (\$/ha)	\$20,589	\$9,775	\$6,527	\$6,711	\$6,896	\$7,081	\$7,265	\$7,450	\$7,635	\$7,820
Target yield (% of full production)	0%	30%	60%	90%	100%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	7.20	14.40	21.60	24.00	24.00	24.00	24.00	24.00	24.00
Expected grape price (\$/t)	\$200	\$385	\$385	\$385	\$385	\$385	\$385	\$385	\$385	\$385
Expected Income (\$/ha)	\$0	\$832	\$3,326	\$7,484	\$9,240	\$9,240	\$9,240	\$9,240	\$9,240	\$9,240
Profit/loss (\$/ha)	-\$20,589	-\$8,944	-\$3,200	\$773	\$2,344	\$2,159	\$1,975	\$1,790	\$1,605	\$1,420
Cumulative profit/loss (\$/ha)	-\$20,589	-\$29,533	-\$32,733	-\$31,960	-\$29,616	-\$27,457	-\$25,482	-\$23,692	-\$22,087	-\$20,667
Replant to in-demand variety	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total Costs (\$/ha)	\$63,511	\$9,775	\$6,527	\$6,711	\$6,896	\$7,081	\$7,265	\$7,450	\$7,635	\$7,820
Target yield (% of full production)	0%	0%	30%	60%	90%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	0.00	7.20	14.40	21.60	24.00	24.00	24.00	24.00	24.00
Expected grape price (\$/t)	\$200	\$385	\$385	\$385	\$385	\$385	\$385	\$385	\$385	\$385
Expected Income (\$/ha)	\$0	\$0	\$832	\$3,326	\$7,484	\$9,240	\$9,240	\$9,240	\$9,240	\$9,240
Profit/loss (\$/ha)	-\$63,511	-\$9,775	-\$5,695	-\$3,385	\$588	\$2,159	\$1,975	\$1,790	\$1,605	\$1,420
Cumulative profit/loss (\$/ha)	-\$63,511	-\$73,287	-\$78,982	-\$82,366	-\$81,778	-\$79,619	-\$77,644	-\$75,854	-\$74,249	-\$72,829

On average, grafting a block costs approximately \$20,000 per hectare in the first year and \$3,500 per hectare in the second year (Tables 1 and 2). The grafting costs include chain sawing vines, removing and replacing the fruiting wire, installing a foliage wire, debarking, purchasing bud wood, grafting, and vine training. Yields are expected to take five years to get back to full production after grafting, with vines producing 0% of the full crop in the first year, 30% in the second, 60% in the third, 90% in the fourth and 100% by the fifth year.

When making these decisions there are many factors to consider...

On average, replanting a block costs approximately \$63,000 per hectare in the first year and \$3,500 per hectare in the second year (Tables 1 and 2). The replanting costs include removing vines and wire, removing trunk and roots, removing trellis, removing irrigation line, new trellis materials and installation, new irrigation materials and installation, planting material, planting and guarding, vine guards, fruiting and foliage wire, materials and installation, and vine training. Yields are expected to take six years to get back to full production after replanting, with vines producing 0% of the full crop in the first year, 0% in the second, 30% in the third, 60% in the fourth, 90% by the fifth year and 100% in the sixth year.

Grape prices

Grape prices for 2024 had not been released at the time of writing this article. The grape prices used in this study are anecdotal and are not a prediction of what grape prices might be for vintage 2024. Growers are encouraged to go

through a thorough cost-benefit analysis exercise using their own figures to make their own informed business decisions.

Exploring the financial outcomes of the different scenarios

Discussion of the financial outcomes in this section are focused on Region 1 (warm). The same general trends apply to Region 2 (cool), with variations in specific figures but consistent themes of losses in the short term and the need for secure contracts to achieve profitability in the long term across these scenarios.

Scenario 1: Producing a crop with a contract

In Region 1, where growers produce contracted Shiraz with a yield cap of 12 t/ha and an average grape price of \$200 per tonne, they face significant losses. The yearly loss amounts to \$3,757 per hectare, gradually increasing with the Consumer Price Index (CPI). Over five years of enduring low demand, the cumulative loss swells to \$20,633 per hectare. After five years, if grape prices rise to \$487 and yield restrictions are lifted, growers begin to turn a profit. However, this profit isn't sufficient to recover the earlier downturn losses. After a decade, growers are still burdened with a cumulative loss of \$18,924 per hectare.

Scenario 2: Producing a crop without a contract

In a market characterised by low demand, growers without contracts face substantial losses. In Region 1, these losses amount to \$6,157 per hectare annually, increasing in tandem with CPI. Over five years, these cumulative losses soar to \$32,633. Even if growers secure a contract later, they do start to make a profit, but it falls short of compensating for the initial downturn losses. Consequently, growers are left with a cumulative loss of \$30,924 per hectare after ten years.

Scenario 3: Vineyard resting

Opting to rest vineyards during periods of low demand proves to be a more prudent choice, reducing losses compared to producing without a contract. In Region 1, resting a vineyard results in yearly losses of \$3,796 per hectare, gradually increasing at a rate of 3% CPI. After five years, this strategy leads to an accumulated loss of \$20,085. If a contract is secured at a later date, it does enable growers to start making a profit, but it still falls short of recouping the earlier downturn losses. After a decade, growers are left with a cumulative loss of \$18,375 per hectare.

Scenario 4: Reworking

Reworking vineyards involves increased variable costs but has the potential to rejuvenate the block. In Region 1, reworking leads to a loss of \$12,562 in the first year, followed by a loss of \$9,775 in the second year. Over five years, this strategy results in a cumulative loss of \$42,472 per hectare. Even if a contract is secured later, the annual profits generated are insufficient to fully recover the costs associated with reworking. Consequently, growers face a cumulative loss of \$40,762 per hectare after ten years.

Scenario 5: Grafting to a new variety

Grafting to a new variety is advisable only with a secure contract. In Region 1, grafting leads to losses initially, with profitability achieved after four years, but not enough to offset grafting costs over ten years, resulting in a loss of \$20,667 per hectare.

Scenario 6: Replanting to a new variety

Similar to grafting, replanting requires a secure contract. In Region 1, replanting results in substantial initial losses, with profitability starting after year five. However, these profits are insufficient to cover replanting costs over ten years, leading to a loss of \$72,829 per hectare.



Table 2 Expected costs, income and profit/loss associated with the different scenarios in Region 2 (cool) over ten years

Produce Shiraz crop with contract	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total Costs (\$/ha)	\$5,817	\$5,992	\$6,166	\$6,341	\$6,515	\$6,690	\$6,864	\$7,039	\$7,214	\$7,388
Target yield (% of full production)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Expected grape price (\$/t)	\$600	\$600	\$600	\$600	\$600	\$1,323	\$1,323	\$1,323	\$1,323	\$1,323
Expected Income (\$/ha)	\$4,800	\$4,800	\$4,800	\$4,800	\$4,800	\$10,584	\$10,584	\$10,584	\$10,584	\$10,584
Profit/loss (\$/ha)	-\$1,017	-\$1,192	-\$1,366	-\$1,541	-\$1,715	\$3,894	\$3,720	\$3,545	\$3,370	\$3,196
Cumulative profit/loss (\$/ha)	-\$1,017	-\$2,209	-\$3,576	-\$5,116	-\$6,832	-\$2,938	\$782	\$4,327	\$7,697	\$10,893
Produce Shiraz crop without contract	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total Costs (\$/ha)	\$5,817	\$5,992	\$6,166	\$6,341	\$6,515	\$6,690	\$6,864	\$7,039	\$7,214	\$7,388
Target yield (% of full production)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	0.00	0.00	0.00	0.00	8.00	8.00	8.00	8.00	8.00
Expected grape price (\$/t)	\$600	\$600	\$600	\$600	\$600	\$1,323	\$1,323	\$1,323	\$1,323	\$1,323
Expected Income (\$/ha)	\$0	\$0	\$0	\$0	\$0	\$10,584	\$10,584	\$10,584	\$10,584	\$10,584
Profit/loss (\$/ha)	-\$5,817	-\$5,992	-\$6,166	-\$6,341	-\$6,515	\$3,894	\$3,720	\$3,545	\$3,370	\$3,196
Cumulative profit/loss (\$/ha)	-\$5,817	-\$11,809	-\$17,976	-\$24,316	-\$30,832	-\$26,938	-\$23,218	-\$19,673	-\$16,303	-\$13,107
Rest vineyard	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total Costs (\$/ha)	\$3,291	\$3,392	\$3,493	\$3,594	\$3,695	\$6,690	\$6,864	\$7,039	\$7,214	\$7,388
Target yield (% of full production)	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	0.00	0.00	0.00	0.00	8.00	8.00	8.00	8.00	8.00
Expected grape price (\$/t)	\$600	\$600	\$600	\$600	\$600	\$1,323	\$1,323	\$1,323	\$1,323	\$1,323
Expected Income (\$/ha)	\$0	\$0	\$0	\$0	\$0	\$10,584	\$10,584	\$10,584	\$10,584	\$10,584
Profit/loss (\$/ha)	-\$3,291	-\$3,392	-\$3,493	-\$3,594	-\$3,695	\$3,894	\$3,720	\$3,545	\$3,370	\$3,196
Cumulative profit/loss (\$/ha)	-\$3,291	-\$6,683	-\$10,177	-\$13,771	-\$17,466	-\$13,572	-\$9,853	-\$6,308	-\$2,937	\$259
Rework without contract	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total Costs (\$/ha)	\$12,093	\$9,425	\$6,166	\$6,341	\$6,515	\$6,690	\$6,864	\$7,039	\$7,214	\$7,388
Target yield (% of full production)	0%	30%	60%	90%	100%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	0.00	0.00	0.00	0.00	8.00	8.00	8.00	8.00	8.00
Expected grape price (\$/t)	\$600	\$600	\$600	\$600	\$600	\$1,323	\$1,323	\$1,323	\$1,323	\$1,323
Expected Income (\$/ha)	\$0	\$0	\$0	\$0	\$0	\$10,584	\$10,584	\$10,584	\$10,584	\$10,584
Profit/loss (\$/ha)	-\$12,093	-\$9,425	-\$6,166	-\$6,341	-\$6,515	\$3,894	\$3,720	\$3,545	\$3,370	\$3,196
Cumulative profit/loss (\$/ha)	-\$12,093	-\$21,518	-\$27,684	-\$34,025	-\$40,541	-\$36,646	-\$32,927	-\$29,382	-\$26,011	-\$22,815
Graft to an in-demand variety	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total Costs (\$/ha)	\$20,119	\$9,425	\$6,166	\$6,341	\$6,515	\$6,690	\$6,864	\$7,039	\$7,214	\$7,388
Target yield (% of full production)	0%	30%	60%	90%	100%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	3.60	7.20	10.80	12.00	12.00	12.00	12.00	12.00	12.00
Expected grape price (\$/t)	\$600	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700
Expected Income (\$/ha)	\$0	\$1,836	\$7,344	\$16,524	\$20,400	\$20,400	\$20,400	\$20,400	\$20,400	\$20,400
Profit/loss (\$/ha)	-\$20,119	-\$7,589	\$1,178	\$10,183	\$13,885	\$13,710	\$13,536	\$13,361	\$13,186	\$13,012
Cumulative profit/loss (\$/ha)	-\$20,119	-\$27,708	-\$26,531	-\$16,348	-\$2,463	\$11,247	\$24,782	\$38,143	\$51,330	\$64,342
Replant to in-demand variety	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Total Costs (\$/ha)	\$63,042	\$9,425	\$6,166	\$6,341	\$6,515	\$6,690	\$6,864	\$7,039	\$7,214	\$7,388
Target yield (% of full production)	0%	0%	30%	60%	90%	100%	100%	100%	100%	100%
Expected harvest yield (t/ha)	0.00	3.60	7.20	10.80	12.00	12.00	12.00	12.00	12.00	12.00
Expected grape price (\$/t)	\$600	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700
Expected Income (\$/ha)	\$0	\$0	\$3,672	\$11,016	\$18,360	\$20,400	\$20,400	\$20,400	\$20,400	\$20,400
Profit/loss (\$/ha)	-\$63,042	-\$9,425	-\$2,494	\$4,675	\$11,845	\$13,710	\$13,536	\$13,361	\$13,186	\$13,012
Cumulative profit/loss (\$/ha)	-\$63,042	-\$72,467	-\$74,961	-\$70,286	-\$58,441	-\$44,731	-\$31,196	-\$17,835	-\$4,648	\$8,364



What do these numbers mean for vineyard owners?

Each year, regardless of the supply and demand conditions, vineyard owners incur substantial fixed and variable costs to maintain their vineyards and produce a crop. In low-demand years, tonnage caps and low grape prices can drive revenue down below the cost of production making winegrape production economically unsustainable in some regions. In this study, we found that with a yield cap set at 12 tonnes per hectare (t/ha), grape prices must surpass \$514 per tonne to enable grapegrowers to achieve a break-even point. As the target yield decreases to 8 t/ha, the break-even threshold for grapegrowers rises to a grape price of \$728 per tonne.

When faced with a situation where crop production is unviable, growers are forced to make tough decisions about how they manage their blocks in the short and long term. Choosing not to produce a grape crop during low-demand years reduces immediate costs significantly. Fixed costs remain stable but variable costs associated with vineyard inputs and operational costs can be reduced significantly. However, vineyard maintenance is still essential to prevent long-term damage and maintain the quality of grapevines for future harvests. It is important for vineyards to receive adequate water and sprays to control pests and disease.

What other factors should be considered?

When making these decisions there are many factors to consider, including how long the low-demand situation is expected to continue, the health of the block, the relationship with the purchasing winery, the viability of achieving an economically sustainable grape price for a different variety in the long term, as well as the grower's personal financial situation and appetite for change.

Short-term vs long-term perspective

The decision to produce or abstain from grape production in low-demand years must be evaluated from both short-term and long-term perspectives. While not producing a crop may provide short-term cost savings, it is not a long-term solution. The likely duration of the low-demand situation will affect the viability of this option.

Ultimately, vineyard owners must carefully weigh these factors and develop strategic plans to navigate the challenges posed by low-demand years in the wine industry.

Risk management

Vineyard owners and winemakers should consider adopting risk mitigation strategies, such as crop insurance and diversification of product offerings. These measures can help alleviate the financial impact of low-demand years. However, it is important that growers seek advice from their purchasing winery before making decisions about changing varieties. Grafting and replanting are costly endeavours. The financial risk of undertaking these operations without a contract or some level of assurance that the fruit will be purchased is significant. Growers undertaking these activities should be confident that an economically sustainable grape price can be achieved for the new variety in the long term.

Failing to check the health status of vines prior to grafting can result in graft failures if vines are infected with grapevine trunk diseases or viruses. Similarly, failing to eliminate remnant

roots harbouring virus-carrying vectors when replanting can have catastrophic results, as can failing to ensure that clean planting material is used.

Sustainability

Maintaining vineyards, even during low-demand years, is essential for preserving the health and sustainability of grapevines. Neglecting vineyard care can result in long-term damage and increased costs in the future.

Conclusions

The cost-benefit analysis of producing a wine-grape crop in low-demand years compared to not producing a crop reveals the complex interplay between short-term financial considerations and long-term strategic goals. While abstaining from production can offer immediate cost savings, it carries risks related to vineyard sustainability. Ultimately, vineyard owners must carefully weigh these factors and develop strategic plans to navigate the challenges posed by low-demand years in the wine industry. Future research could explore additional strategies, such as vineyard diversification and alternative revenue streams, to further enhance decision-making in this context.

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