

ATCHISON CONSULTANTS



INCLUSION OF AUSTRALIAN AGRICULTURE IN A PORTFOLIO

JULY 2021

TAG Asset Consulting Group Pty Ltd (ABN 58 097 703 047, AFSL no 230846)

Trading as Atchison Consultants

Level 3, 155 Queen Street, Melbourne VIC 3000

enquiries@atchison.com.au www.atchison.com.au

P: +61 3 9642 3835

This report commissioned by

 **AAM**
Investment Group

INTRODUCTION

Analysis of historical and forecast performance generated by investment in Australian agricultural property has been undertaken.

Total performance from agricultural property investment has been generated. Total returns consist of capital returns from investment in land and improvements; and income returns from activities conducted on agricultural land. Returns provide a broad measure of performance of the sector. The returns can be used in portfolio construction analysis. Assessment of the historical total return performance of Australian agricultural property investment over 25 years to 31 December 2020 and forecasts have been undertaken.

This analysis provides a broad measure of performance of agricultural property investment in Australia. It can be used to assess the impact on returns and volatility of returns of an investment portfolio from the inclusion of agricultural property. Reward against volatility being the Sharpe Ratio has been generated.

1 Historical analysis

1.1 Inclusion of Australian agricultural property in a portfolio

Analysis has been conducted on the effect of adding exposure to Australian agricultural property within a diversified portfolio based on historical performance.

The analysis is based on historical data for major asset classes.

Table 1 shows the return and volatility of returns of major asset classes and Australian agricultural property for 25 years to 31 December 2020.

Table 1: Asset classes historical returns and volatility of returns – 25 years to December 2020

Major Asset Classes	Return (% p.a.)	Volatility (% p.a.)
Australian agriculture	7.6	4.7
Australian shares	8.6	13.5
Overseas shares	7.1	12.3
Australian listed property	7.6	17.5
Overseas listed property (hedged)	7.5	17.5
Australian fixed interest	6.1	3.1
Overseas fixed interest (hedged)	6.9	2.9
Australian cash	4.3	2.4

Source: Atchison Consultants, MSCI, S&P/ASX, S&P/Citigroup, Bloomberg



1.2 Adding exposure within a diversified portfolio

Analysis has been conducted on the effect of adding exposure to Australian agricultural property within a broadly diversified portfolio based on performance history over 25 years to December 2020.

Table 2 shows five diversified portfolios with incrementally increasing allocations to Australian agricultural property.

Table 2: Diversified portfolio asset allocations

	P1 %	P2 %	P3 %	P4 %	P5 %
Australian shares	28.0	26.0	24.0	23.0	22.0
Overseas shares	27.0	26.0	25.0	23.0	21.0
Australian listed property	10.0	9.0	8.0	7.0	6.0
Overseas listed property	5.0	4.0	3.0	2.0	1.0
Australian fixed interest	13.0	13.0	13.0	13.0	13.0
Overseas fixed interest	12.0	12.0	12.0	12.0	12.0
Australian cash	5.0	5.0	5.0	5.0	5.0
Australian agriculture	0.0	5.0	10.0	15.0	20.0
Total	100.0	100.0	100.0	100.0	100.0

Source: Atchison Consultants

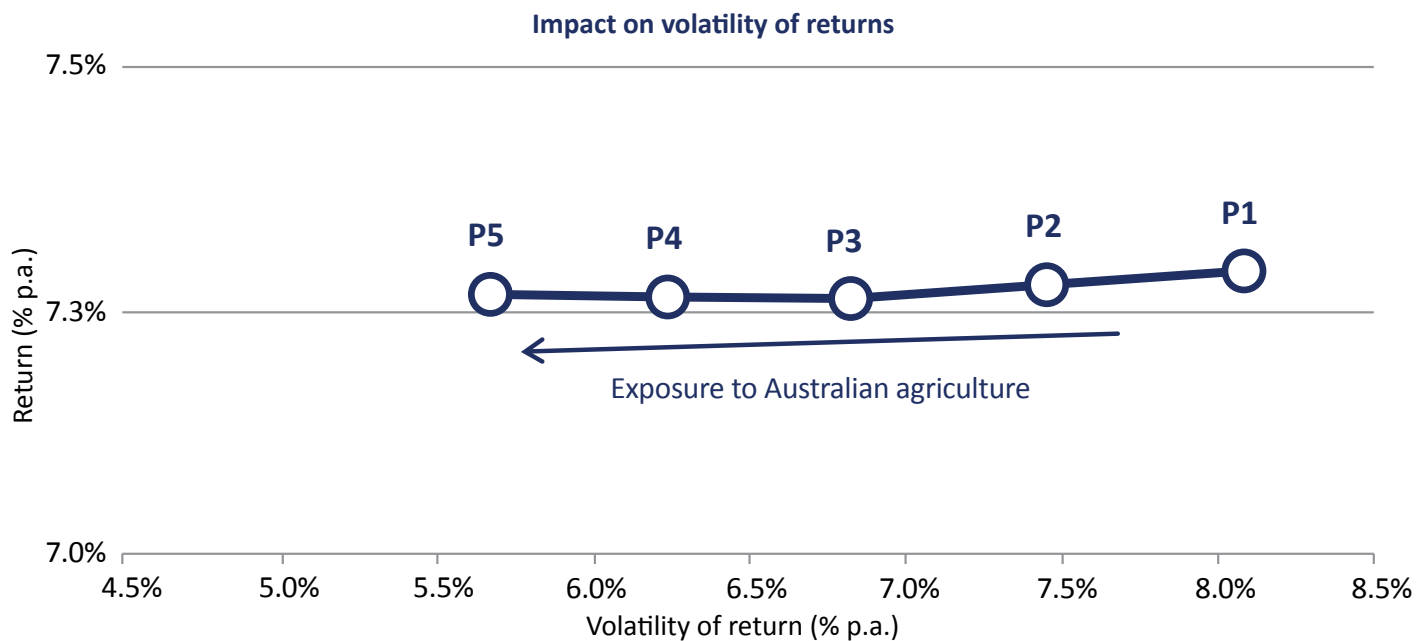
Table 3 shows correlations of returns from asset classes for the 25 years to December 2020. Australian agriculture has a low correlation of returns with returns from other asset classes.

Table 3: Asset class correlation of returns – 25 years to December 2020

	Australian agriculture	Australian shares	Overseas shares	Australian listed property	Overseas listed property	Australian fixed interest	Overseas fixed interest	Australian cash
Australian agriculture	1.00	-0.05	-0.18	-0.03	-0.02	-0.07	-0.02	0.04
Australian shares	-0.05	1.00	0.54	0.69	0.72	-0.08	-0.12	-0.06
Overseas shares	-0.18	0.54	1.00	0.42	0.40	-0.02	-0.23	-0.10
Australian listed property	-0.03	0.69	0.42	1.00	0.69	0.17	0.14	-0.08
Overseas listed property	-0.02	0.72	0.40	0.69	1.00	-0.04	0.01	-0.06
Australian fixed interest	-0.07	-0.08	-0.02	0.17	-0.04	1.00	0.69	0.23
Overseas fixed interest	-0.02	-0.12	-0.23	0.14	0.01	0.69	1.00	0.17
Australian cash	0.04	-0.06	-0.10	-0.08	-0.06	0.23	0.17	1.00

Chart 1 shows the portfolio returns and volatility of returns for the five diversified portfolios, which hold increasing allocations to Australian agricultural which are shown in Table 2.

Chart 1 - Inclusion of Australian agricultural property in a diversified portfolio



Adding Australian agricultural property to a diversified portfolio would produce stable returns while significantly reducing the volatility of returns.

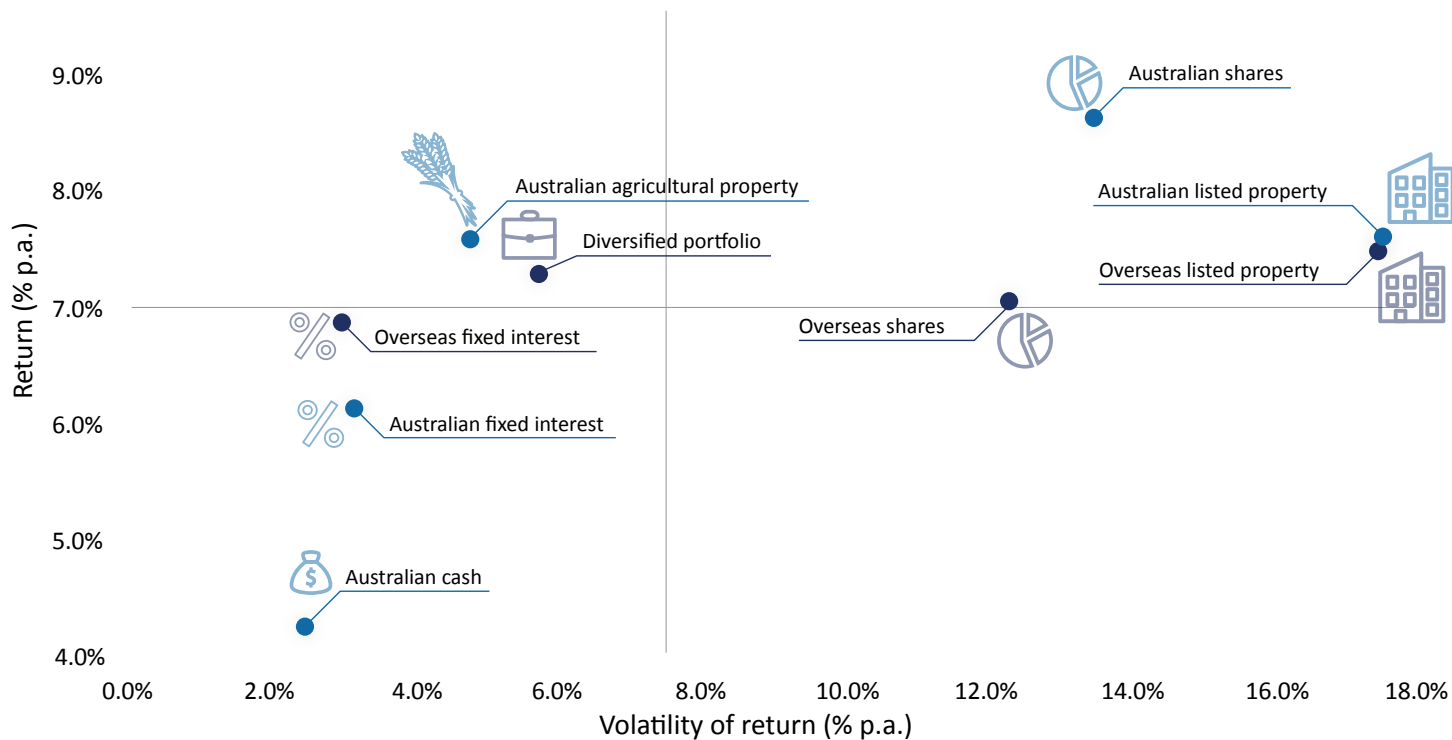


In Chart 2 is shown the annual returns and the volatility of returns of seven asset classes and a diversified portfolio over 25 years to December 2020. The diversified portfolio is structured based on an average asset allocations of a generic superannuation fund.

Asset class performance of sectors in the top-left hand quadrant show higher returns and lower volatility of returns which provides preferred investment outcomes for investors and includes Australian Agricultural property. Australian shares provided the highest return over 25 years with high volatility of returns.

Chart 2 –Asset class returns and volatility of returns

Performance of Australian agriculture positioning in four quadrants



In Chart 3 is shown returns and volatility of returns from the top 25% broadacre farms by return and size and performance of seven asset classes.

Chart 3 –Asset class returns and volatility of returns

Performance of top 25% of Australian agriculture positioning in four quadrants

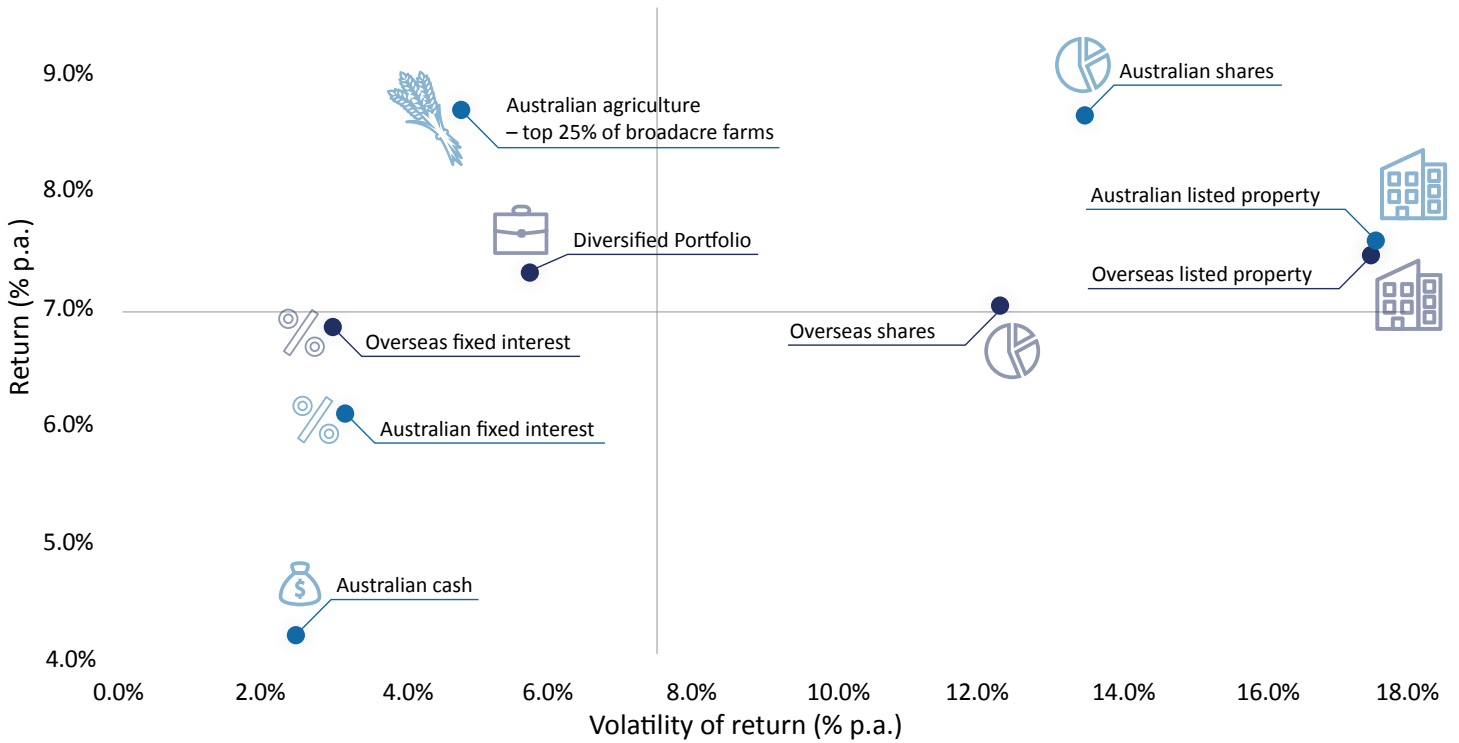


Table 4 shows the Sharpe ratios for the five diversified portfolios. Sharpe ratio measures the additional return above the risk-free rate being cash, against the volatility of return of the portfolio.

Table 4: Diversified portfolio Sharpe ratio – 25 Years to December 2020

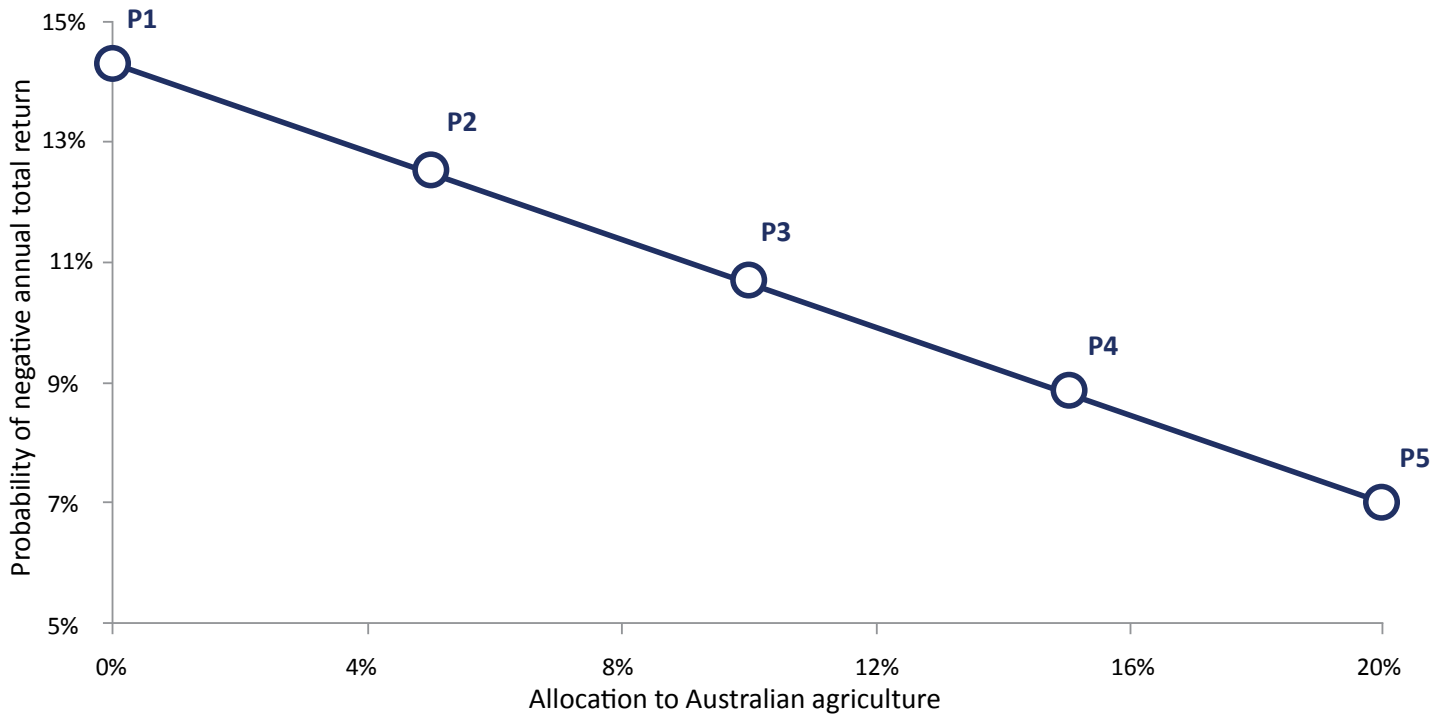
	P1 (%)	P2 (%)	P3 (%)	P4 (%)	P5 (%)
Sharpe ratio	0.90	0.98	1.06	1.16	1.28

Source: Atchison Consultants

Inclusion of Australian agricultural property within a diversified portfolio would improve the volatility adjusted return, as measured by the Sharpe ratio, as the allocation to Australian agricultural property increases.

In Chart 4 is shown the probability of negative annual total return within a diversified portfolio with increasing proportion invested in Australian Agriculture.

Chart 4 – Probability of negative annual total returns in a diversified portfolio



When introducing an increasing proportion invested in Australian agriculture in a diversified portfolio, the probability of a negative annual total return would have been significantly reduced.



2 Forecast analysis

2.1 Inclusion of Australian agricultural property in a portfolio

Analysis has been conducted on the effect of adding exposure to Australian agricultural property within a diversified portfolio based on forecast performance. The analysis is based on forecast performance for major asset classes and Australian Agriculture.

Table 5 shows forecast return and volatility of returns of major asset classes and Australian agricultural property over 10-years. The projected volatility of returns of the Australian agriculture is based on the historical volatility.

Table 5: Asset classes returns and volatility of returns – forecasts

Major asset classes	Returns (% p.a.)	Volatility of returns (% p.a.)
Australian agriculture	9.1	8.3
Australian shares	8.4	14.3
Overseas shares	6.3	11.5
Australian listed property	6.3	17.4
Overseas listed property (hedged)	6.0	12.9
Australian fixed interest	2.2	4.0
Overseas fixed interest (hedged)	1.6	2.9
Australian cash	1.8	0.4

Source: Atchison Consultants, MSCI, S&P/ASX, S&P/Citigroup, Bloomberg, SSgA

2.2 Adding exposure within a diversified portfolio

Analysis has been conducted on the effect of adding exposure to Australian agricultural property within a broadly diversified portfolio.

Table 6 shows five diversified portfolios with increasing allocations to Australian agricultural property.

Table 6: Diversified portfolio asset allocations

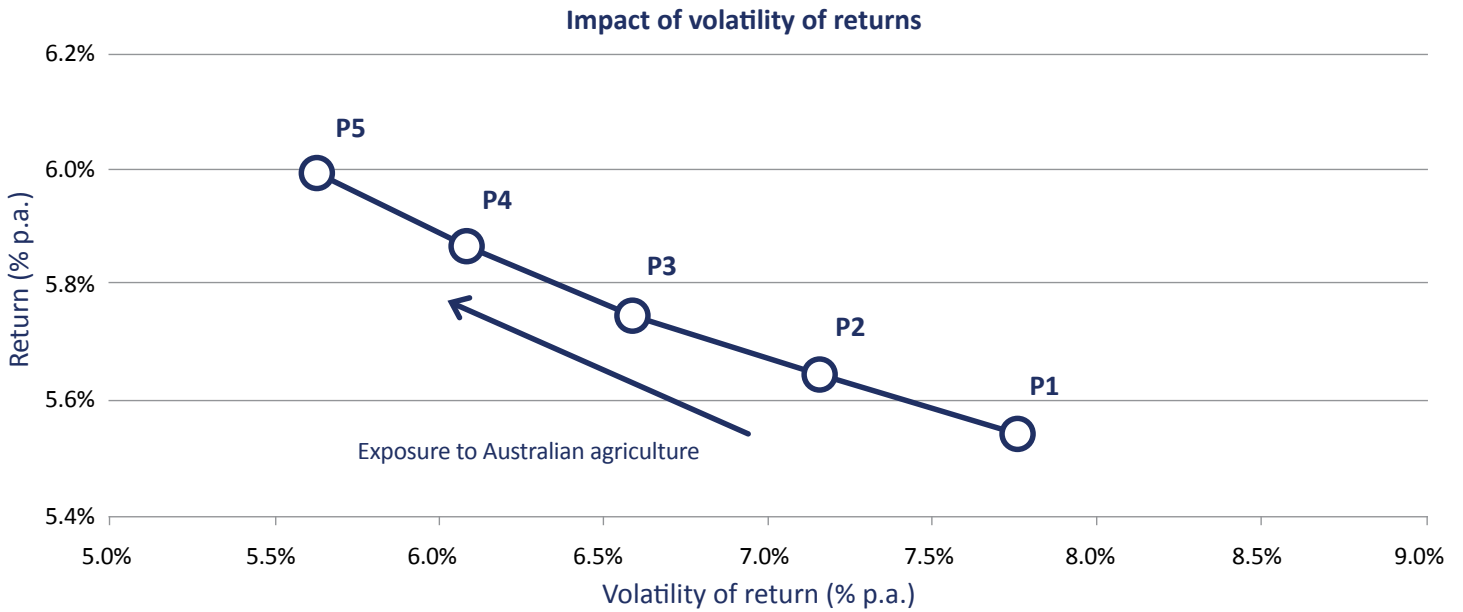
	P1 (%)	P2 (%)	P3 (%)	P4 (%)	P5 (%)
Australian shares	28.0	26.0	24.0	23.0	22.0
Overseas shares	27.0	26.0	25.0	23.0	21.0
Australian listed property	10.0	9.0	8.0	7.0	6.0
Overseas listed property	5.0	4.0	3.0	2.0	1.0
Australian fixed interest	13.0	13.0	13.0	13.0	13.0
Overseas fixed interest	12.0	12.0	12.0	12.0	12.0
Australian cash	5.0	5.0	5.0	5.0	5.0
Australian agriculture	0.0	5.0	10.0	15.0	20.0
Total	100.0	100.0	100.0	100.0	100.0

Source: Atchison Consultants



Chart 5 shows the portfolio returns and volatility of returns for the five diversified portfolios, which hold increasing allocations to Australian agricultural which are shown in Table 6.

Chart 5 - Inclusion of Australian agricultural property in a diversified portfolio



Inclusion of Australian agricultural property in a diversified portfolio would produce increased portfolio returns while significantly reducing the volatility of returns on a forecast performance basis.

Chart 6 – Forecast asset classes returns and volatility of returns

Forecast performance of Australian agriculture positioning in four quadrants

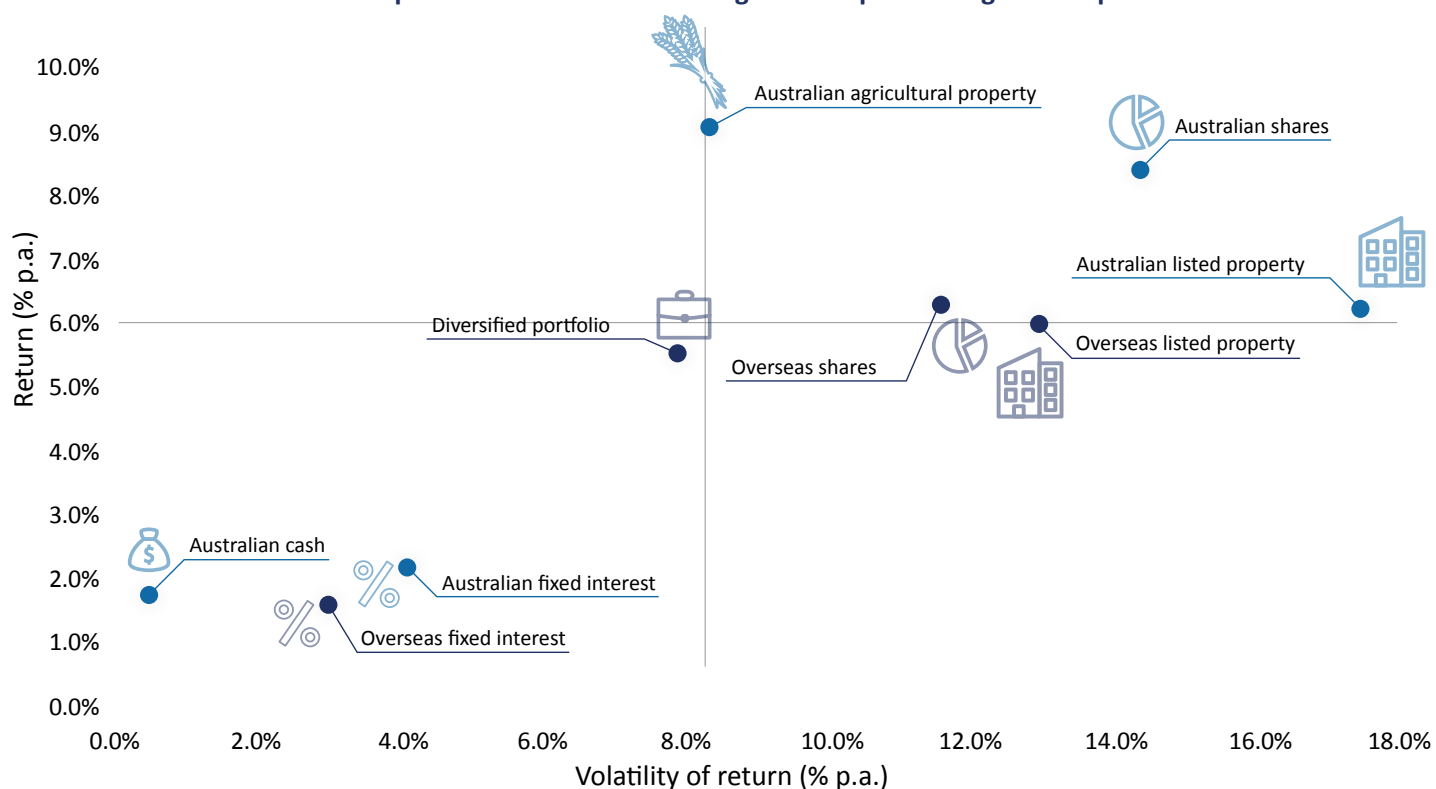


Chart 6 shows the annual returns and the volatility of returns of seven asset classes and a diversified portfolio on a forecast basis. The diversified portfolio is structured based on an average asset allocations of a generic superannuation fund. Asset classes showing high returns and lower volatility of returns, as demonstrated for Australian Agriculture, provides preferred investments for investors.

Table 7 shows the Sharpe ratios for the five diversified portfolios. The Sharpe ratio measures the additional return above the risk-free rate, being cash, against the volatility of return of the portfolio.

Table 7: Diversified portfolio Sharpe ratio

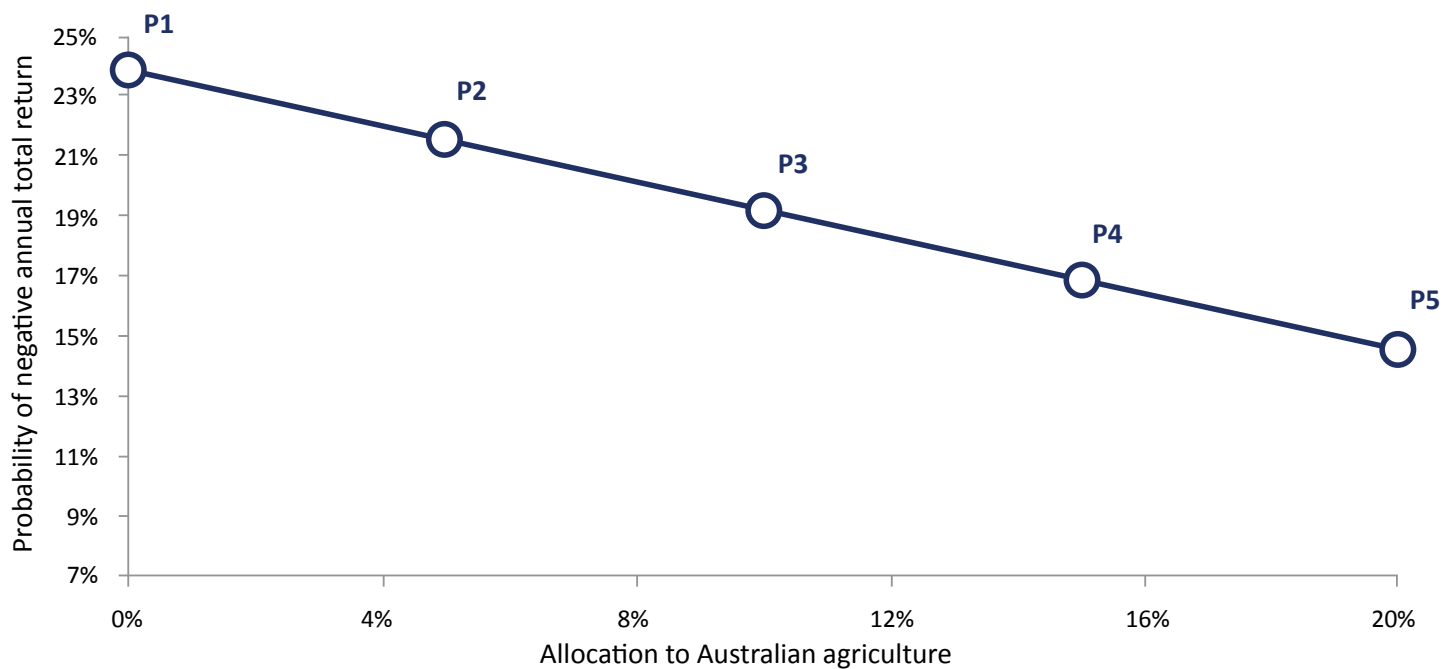
	P1 (%)	P2 (%)	P3 (%)	P4 (%)	P5 (%)
Sharpe ratio	0.71	0.78	0.87	0.96	1.06

Source: Atchison Consultants

Inclusion of Australian agricultural property within a diversified portfolio would improve the volatility adjusted return, as measured by the Sharpe ratio, as the allocation to Australian agricultural property increases.

Chart 7 represents the probability of negative annual total return within a diversified portfolio with increasing proportion invested in Australian agriculture based on forecast performance.

Chart 7 – Probability of negative annual total returns in a diversified portfolio - forecasts



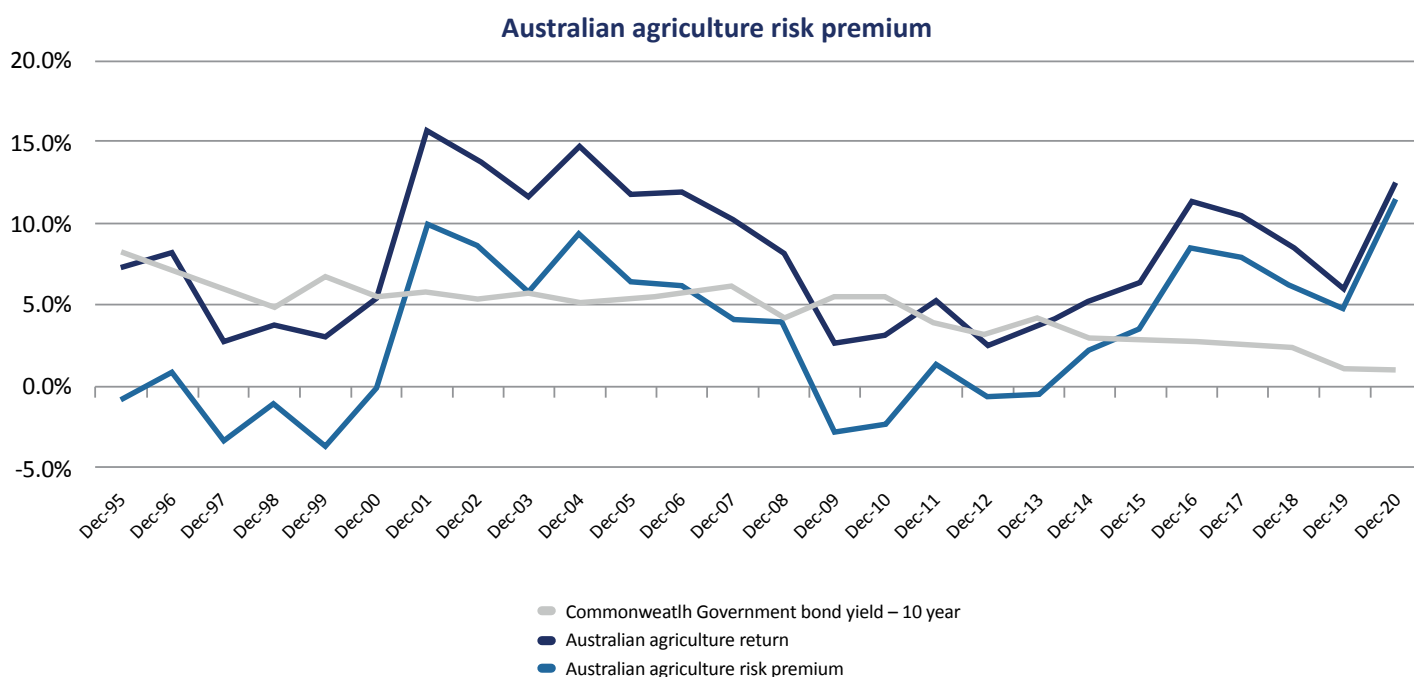
When introducing an increasing proportion invested in Australian agriculture in a diversified portfolio, the probability of negative annual total return will be significantly reduced.



3 Australian agriculture attributes

In Chart 8 is shown annual returns for agriculture compared with 10-year Commonwealth Bond Yields over 25 years to December 2020.

Chart 8 – Australian agriculture return and Government bond yield 25 years to December 2020



It shows returns from agriculture have fallen with bond yields reflecting a relatively stable return premium.

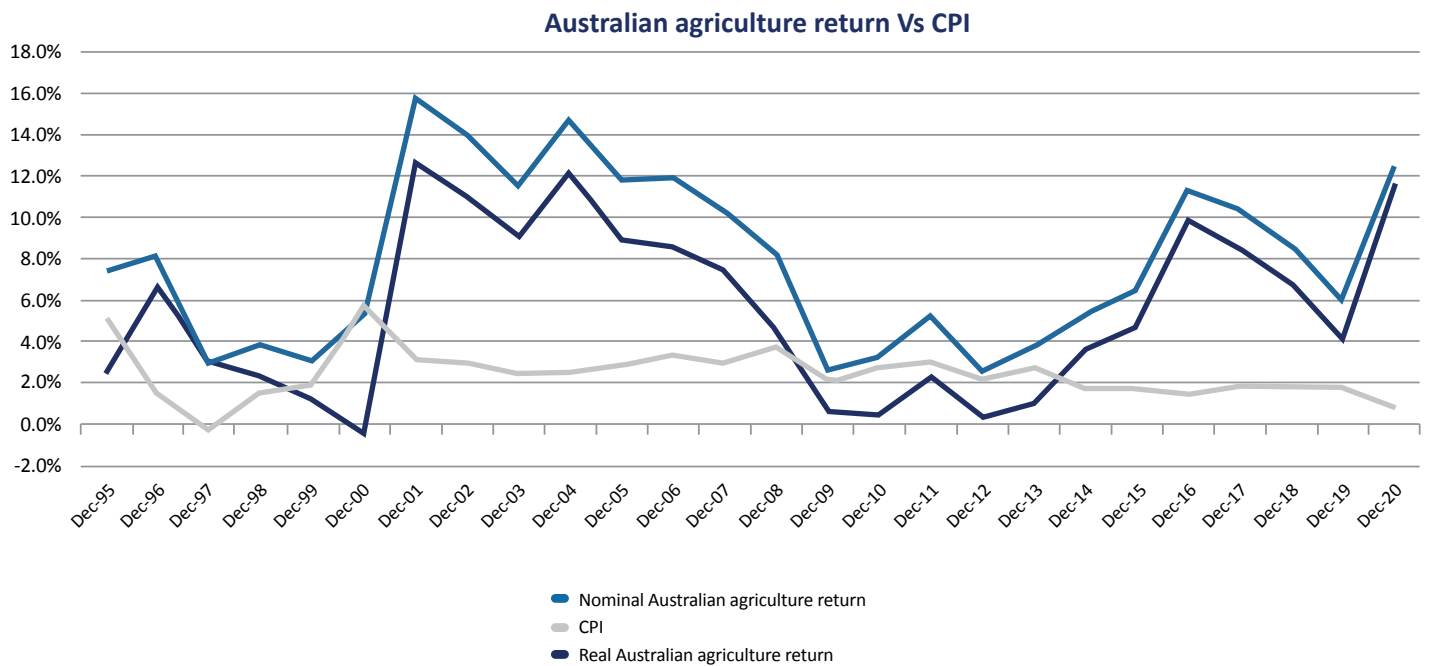
In Table 8 the risk premium of Australian agriculture over 25 years is 3.5%. This is the premium above the average 10 year government bond yield. Equity risk premium for listed shares is 5% - 6% over the long term.

Table 8: Average agriculture returns vs Government bonds to december 2020

Timeframe	Commonwealth Government bond yield – 10 year (p.a.)	Agriculture index returns (pa.)	Agriculture risk premium (p.a)
3 years	1.5%	9.0%	7.5%
5 years	2.0%	9.8%	7.8%
10 years	2.7%	7.2%	4.5%
15 years	3.6%	7.2%	3.6%
20 years	4.1%	8.8%	4.7%
25 years	4.5%	8.0%	3.5%

Chart 9 shows annual returns for agriculture against CPI over 25 years to December 2020.

Chart 9 – Australian Agriculture Return and CPI 25 years to December 2020



It shows that returns are not impacted by inflation in the years under review. Table 9 shows the average nominal and real Australian agriculture returns for the 25 years to December 2020. A real return of 5.7% has been achieved over the 25 years to December 2020.

Table 9: Real agriculture returns to December 2020

Timeframe	CPI (p.a.)	Nominal Australian agriculture return (p.a)	Real Australian agriculture return (p.a.)
3 years	1.5%	9.0%	7.5%
5 years	1.6%	9.8%	8.2%
10 years	1.9%	7.2%	5.3%
15 years	2.2%	7.2%	5.0%
20 years	2.4%	8.8%	6.4%
25 years	2.3%	8.0%	5.7%

Table 10 shows the rate of return for the 25% of beef, sheep, lamb slaughter and broad acre farms generating the highest rate of return, for 25 years and 42 years to December 2019. The returns are a significant 4.4% to 6.5% above the average.

Table 10: Rate of return – top 25% of farms

	Top 25% of farms – average rate of return (42 years to 2019) (p.a.)	All Farms combined – average rate of return (42 years to 2019) (p.a.)	Top 25% of farms – average rate of return (25 years to 2019) (p.a.)	All farms Combined – average rate of return (25 years to 2019) (p.a.)
Beef	11.5%	6.1%	8.8%	4.2%
Sheep	12.3%	5.8%	11.3%	5.1%
Lamb slaughter*	—	—	10.4%	5.6%
Broadacre^	—	—	8.7%	4.3%

*Data unavailable for the 42 years to 2019. Source ABARES

^ Broadacre data shows the average rate of return across all Australian farms. Data is unavailable for the 42 years to 2019. Source ABARES

Chart 10 shows the impact of an increasing number of commodities on volatility of returns from Australian agriculture over 25 years to December 2020. It shows that the expected return from Australian agriculture remains constant while the volatility of returns is high from a single commodity and declines as the number of commodities increases to 11.

Chart 10 – Australian agriculture returns and volatility of returns and number of commodities

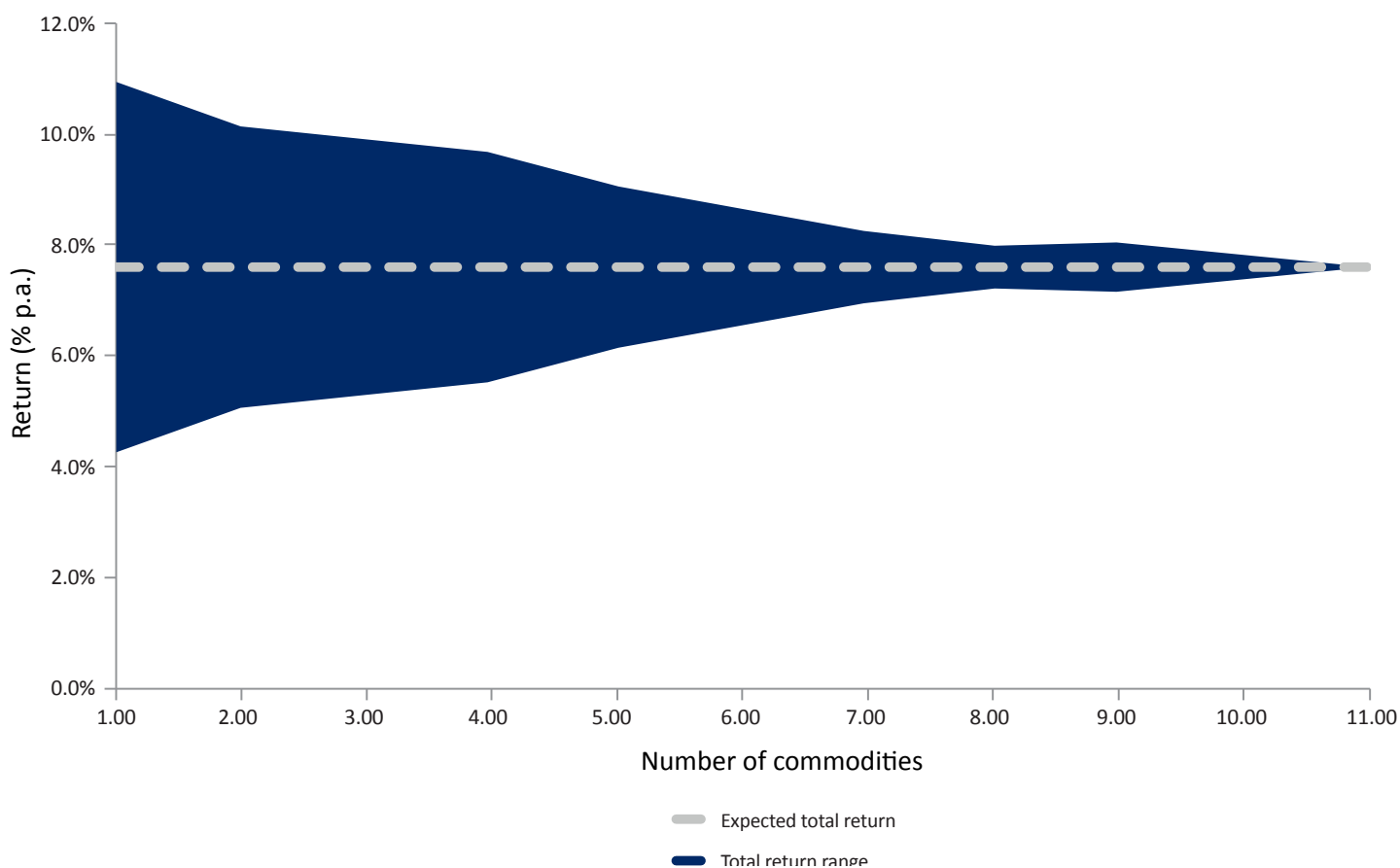


Table 11 shows correlations of change in prices of commodities for the 25 years to December 2020. Cotton has a low correlation with price changes of all other commodities.

Table 11: Commodity correlation of change in prices – 25 years to December 2020

	Beef	Barley	Lamb	Wool	Wheat	Cotton	Dairy	Sugar	Rice	Canola	Timber
Beef	1.00	0.65	0.92	0.89	0.58	0.09	0.83	0.41	0.59	0.70	0.87
Barley	0.65	1.00	0.68	0.72	0.91	0.10	0.78	0.23	0.43	0.80	0.60
Lamb	0.92	0.68	1.00	0.90	0.62	0.23	0.87	0.56	0.62	0.75	0.95
Wool	0.89	0.72	0.90	1.00	0.61	0.34	0.76	0.44	0.40	0.72	0.82
Wheat	0.58	0.91	0.62	0.61	1.00	0.06	0.74	0.15	0.36	0.69	0.47
Cotton	0.09	0.10	0.23	0.34	0.06	1.00	0.12	0.43	-0.03	0.13	0.19
Dairy	0.83	0.78	0.87	0.76	0.74	0.12	1.00	0.55	0.55	0.87	0.86
Sugar	0.41	0.23	0.56	0.44	0.15	0.43	0.55	1.00	0.05	0.41	0.58
Rice	0.59	0.43	0.62	0.40	0.36	-0.03	0.55	0.05	1.00	0.56	0.67
Canola	0.70	0.80	0.75	0.72	0.69	0.13	0.87	0.41	0.56	1.00	0.71
Timber	0.87	0.60	0.95	0.82	0.47	0.19	0.86	0.58	0.67	0.71	1.00



Report expiry date

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Report prepared by: Chris Owens

Report authorised by: Ken Atchison

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