



Top 25% Agri – Secure Performance.

2013

Executive Summary

- ⇒ Australian institutional investors have under-invested in agriculture because of perceptions of high risk and poor returns. This paper investigates these perceptions and demonstrates that quite the reverse is true.
- ⇒ 32 years of data for Australian shares, Australian cash, Australian 10-year bonds, Australian listed property trusts, International shares and International bonds were compared against agriculture as an investment.
- ⇒ The Top 25% of Agriculture can produce returns almost as good as Australian shares.
- ⇒ Returns from Top 25% Agri are substantially less volatile than Australian shares, listed property and international shares.
- ⇒ Agriculture is not correlated to equities and provides a strong inflation hedge.
- ⇒ The addition of agricultural investment in a portfolio can substantially reduce volatility for a limited (if any) reduction in overall returns.
- ⇒ The Top 25% segment of Australian agriculture is a sensible choice when considering diversification, stability of returns or absolute returns for a portfolio, for institutions, family, offices or professional investors.

1 Introduction

This paper answers the question: *does an allocation to agriculture improve portfolio performance?* We look at how agriculture performs from a returns perspective and what impact it has if included in an investment portfolio.

This 2013 report is an update and extension to the paper “*Does Agriculture Improve Portfolio Performance?*” first released by AAG in 2004. The data now covers a 32 year time span.

Diversification is one of the fundamental strategies for managing investment risk. The alternatives can include:

- ⇒ *Between investments* i.e. between equities, bonds, property or cash;
- ⇒ *Within securities* i.e. investing in single asset classes; and
- ⇒ *Between industries* i.e. agriculture and manufacturing.

Most investors would be very familiar with all of these methods of diversification through the use of equities, property and fixed interest securities such as bonds. Farmland is another form of diversification, which in many cases is included as part of the property asset class.

We contend that historically, farmland has been under invested by institutions and professional investors, particularly in a domestic setting.

In Australia, media reporting of droughts, floods, natural disasters and financial failures have produced an overwhelmingly negative attitude towards agriculture as an investment class. However, the data presented in this report demonstrates that the Top 25% of

Australian farmers produce excellent, stable returns, in both an absolute and comparative sense. Our experience is that the Top 10% of farmers do even better.

The benefits of including agriculture in portfolios has been reported previously in numerous research journals including in 1985⁽¹¹⁾, 1992⁽¹²⁾, 1999⁽¹³⁾, 2002⁽¹⁴⁾, 2005⁽¹⁵⁾, 2008⁽¹⁶⁾, 2009⁽¹⁷⁾, 2010⁽¹⁸⁾ and 2010⁽¹⁹⁾. This paper similarly demonstrates the tangible benefits of including an allocation to agriculture in investment portfolios.

2 Data Sources

We have used a common time series which covers 32 years from 1980/01 to 2011/12.

Agricultural data is less readily available in Australia than in some countries. The data used to create the figures presented in this paper has been sourced from The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES⁽³⁾).

Each year ABARES collects a comprehensive set of physical and financial performance information from a range of farmers throughout each state. This data is pooled and analysed to produce the annual Australian Farm Survey Results report, made available towards the end of the following financial year. We have used the Farm Surveys data as our source data for agricultural returns.

Comparative returns data for the other asset classes examined has been accessed from several sources including:

- ⇒ Standard and Poor's – historical All Ordinaries Price and Accumulation indices data and Listed Property Trust Price and Accumulation indices data ⁽¹⁾;
- ⇒ Reserve Bank of Australia – historical cash rates ⁽²⁾; and
- ⇒ Wren Research Investment Advisers – Australian 10-Year and USA Treasury Bond data and MSCI World (ex Australia) price and accumulation data ⁽⁴⁾.

The methodology used is explained throughout this report.

3 How has Agriculture performed over the 32-year period?

For ease of comparison, ABARES segregates farm performance into the following industries;

- (1) Wheat and other crops,
- (2) Mixed crops and livestock,
- (3) Sheep,
- (4) Beef,
- (5) Sheep and beef, and
- (6) Dairy.

ABARES also has a catch-all category called “All Broadacre” which includes all of the above enterprises, excluding dairy. In this paper these categories are referred to as Agri sectors.

Broadacre and dairy farms are responsible for managing 90% of agricultural land in Australia and for the five years ending 2011-12 were reported to account for an estimated 55% of the total gross value of agricultural production ⁽⁶⁾.

ABARES also splits each Agri sector into subsections of performance. In this paper we concentrate on two – the Top 25% and all others. Our view is that professionally managed farmland, well-resourced with capital and knowledge, whether family owned or corporate owned, ought to be represented by the Top 25% grouping.

At present this group is overwhelmingly family owned and operated entities. Top 25% farmers are the target market for much corporate/foreign investment.

Figure 1 illustrates the returns for the Top 25% of performers by Agri sector over the 32 year analysis period.

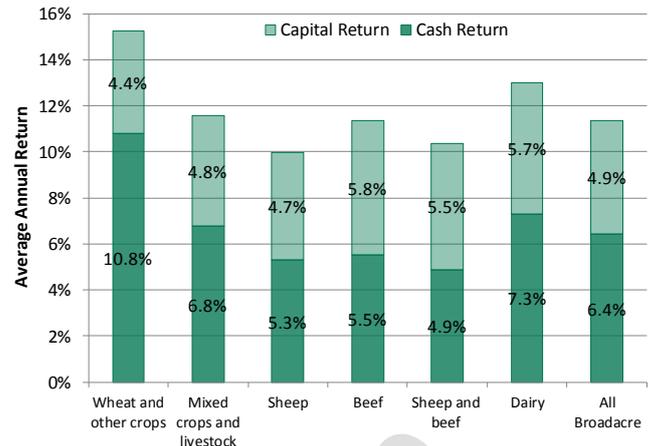


Figure 1. Chart showing the average annual returns by industry broken up by source of total return

Average annual returns across all industries have remained good, with “wheat and other crops” being the standout performer at 15.2% average return per annum with a large component of that coming from the cash return (Figure 1). Average annual return from the dairy sector came in next best at 13%, with the major component of that also coming from the cash return.

Looking at the All Broadacre category, the result is less robust, though still creditable, with an average annual return over 32 years of 11.3% (Figure 1). When the All Broadacre category is further segmented by financial performance, comparing the Top 25% Agri performers and ‘The Rest’, the result is as seen in the following chart (Figure 2).

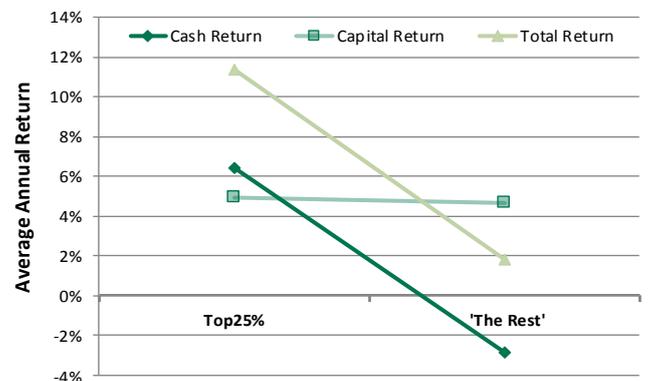


Figure 2. Chart showing the “All Broadacre” returns segregated by performance

By definition, the Top 25% of performers produce higher returns, however it is interesting to note that capital growth is remarkably similar for the better and worse performers (4.9% and 5.2%, respectively; Figure 2). It is clear that cash returns do not of themselves drive land price growth – yet. This information ought to provide considerable scope for astute land buyers to generate strong cash returns.

Figure 3 illustrates the progressive success of Top 25% Agri in contrast to 'The Rest', over the 32 year analysis period.

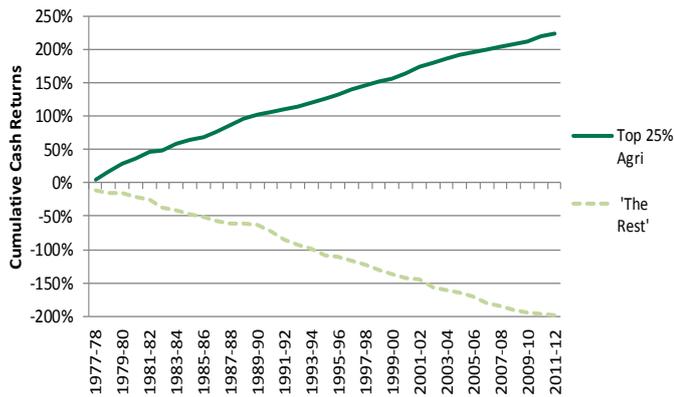


Figure 3. Chart showing the cumulative cash returns for the Top 25% Agri performers and 'The Rest'

It is clear that the Top 25% of farmers performed comprehensively better than 'The Rest', with cumulative cash returns climbing steadily over the 32 years, despite the impact of seasonal events and price volatility.

This dominance is the result of a number of factors, such as variance in property scale, capitalisation, natural resources and the quality of management. Further, ABARES predicts that increasing rates of new investment by Top 25% Agri is likely to support continued productivity gains and improve real farm cash returns over the long term ⁽⁶⁾.

4 How Does Agriculture Compare to Other Asset Classes?

Overall returns are derived from two sources – (1) capital growth and (2) dividends or operational income, which we call cash returns.

A price index, such as the All Ordinaries Index, is a measure of changes in the underlying capital value.

An accumulation index is a total returns index, taking into account both capital growth and annual distributions. Accumulation indices assume the dividends are reinvested back into the underlying assets.

Changes in the capital value of a set of agricultural investments could be compared to a price index. When you add the income or dividends from farming operations, an accumulation index or total returns index is created.

Throughout this report the **Top 25% of agriculture means an accumulation index of the 25% best performing farms as measured by ABARES.** Given that there are a substantial number of farms that are not run purely on commercial lines we have used the top 25% of performers as a measure of the

professional, well scaled well capitalised, well managed commercial operations in broadacre agriculture. In other words, the level of agriculture that most farmers aspire to and which should be invested in by institutions.

For the purposes of this analysis, and to align Top 25% Agri with other investment options, we have assumed that the dividends (cash returns) from farming operations are reinvested in the underlying capital (property), but in reality this cannot always occur.

We have used the annual returns data from each investment sector to assess the growth in value of \$1,000 from 30 June 1980 to 30 June 2012 and to produce an index for each asset class.

The growth in the \$1,000 for each asset class is illustrated in Figure 4.

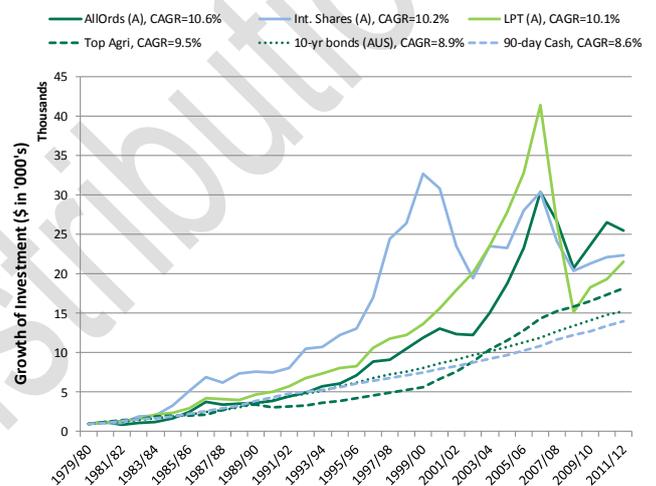


Figure 4. Chart showing the growth of \$1,000 from 30 June 1980 to 30 June 2012 if invested in the various asset classes (CAGR=Compound Annual Growth Rate, (A) = Accumulation Index)

Compound Annual Growth Rate (CAGR) is the percent return required to reach the 2011/12 income figures produced when we calculated the index (Figure 4) assuming the dividends are reinvested and compounded.

The CAGR differs to the average annual return, which is simply the arithmetic mean of the annual returns.

If \$1000 was invested on 30th June 1980, then;

- The total returns from All Ordinaries would have grown to \$25,461, a CAGR of 10.6% (Figure 4).
- International shares would have grown to \$22,334, a CAGR of 10.2%.
- Australian listed property came next with \$21,518, a CAGR of 10.1%.
- Top 25% Agri would have grown to \$18,193, a CAGR of 9.5%.
- Bonds and cash came in after this.

Over a much shorter time frame (the 6 years to 2012) the result is quite different:

- Top 25% Agri delivered a CAGR of 6.0%.
- Bonds and cash came in second and third, with 5.2% and 5.3% respectively.
- The All Ordinaries delivered a mere 1.5%.
- International shares came fifth delivering a CAGR of -3.8%.
- Australian listed property came last with a CAGR of -6.8%.

This shorter time series helps to demonstrate the relatively low volatility of Top 25% Agri and its lack of correlation with particular equities (discussed in Section 6). This is particularly apparent during the internationally turbulent period of 2007-12.

4.1 Can returns from Agriculture compete with other asset classes in the long term?

The other side to the returns equation is at what level of risk or volatility were these returns achieved? Whilst the profile of the lines for each asset class (Figure 4) provide a visual means of assessing volatility, this aspect is detailed further in this section.

To further assess how Agriculture fares as an investment when compared to other asset classes, we have created charts to illustrate the cumulative cash returns of Top 25% Agri compared to the major asset classes over three separate 10yr periods.

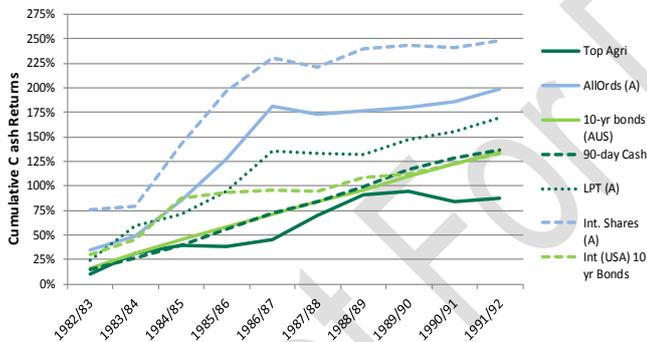


Figure 5a. Cumulative cash returns for 10yr period, 1982/83 to 1991/92

Over this period Top 25% Agri performed poorly in comparison to other asset classes. All investments tracked a remarkably consistent course – with low levels of volatility. Over the period 1989-92 Top 25% Agri did essentially nothing.

This was a period characterised by economic change in Australian agriculture. Interestingly, in “doing essentially nothing”, Top 25% Agri weathered that particularly difficult period. A comparison of how other asset classes’ deal with great change can be seen in figure 5c.

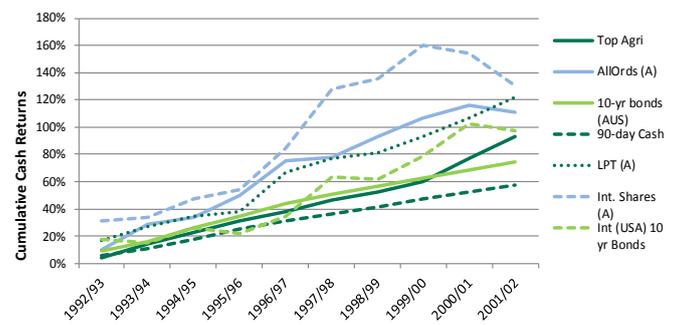


Figure 5b. Cumulative cash returns for 10yr period, 1992/93 to 2001/02

The consistency of performance in the previous 10 year period above is thrown into disarray in the period presented (Figure 5b). Top 25% Agri moves from last to the middle of the field, showing a consistent climb in indexed returns. A reasonable to high level of volatility impacts on several other asset classes.

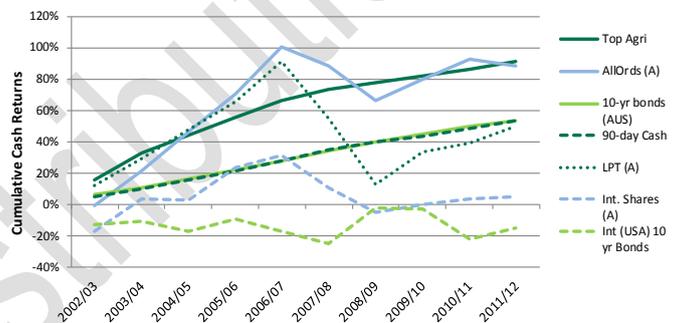


Figure 5c. Cumulative cash returns for 10yr period, 2002/03 to 2011/12

Top 25% Agri over this period is the only asset class which provided a consistent return. This is despite the so called “10 Year Drought”, the Global Financial Crisis and a rollercoaster commodity price ride. Only cash provided a similar level of stability of return – though at a substantially lower rate of performance.

5 What is the Volatility of Agriculture Compared to Other Assets?

The simple philosophy of “don’t put all your eggs in one basket” is why an investor wouldn’t just invest into the momentarily highest returning asset class.

Given that an investor cannot always choose when they will sell their investment, a high level of volatility may mean that an investment is sold when it is well below its peak or average value. This is one reason why an investor should consider assets other than the momentarily highest returning asset classes.

This concept is demonstrated in the following chart (Figure 6) where we see that each of the two example asset classes has a different level of volatility. While Australian shares have produced a higher return, the chart graphically demonstrates that returns

from Top 25% Agri are evidently much less volatile, particularly over the period from 1993-2012 – almost 20 years.

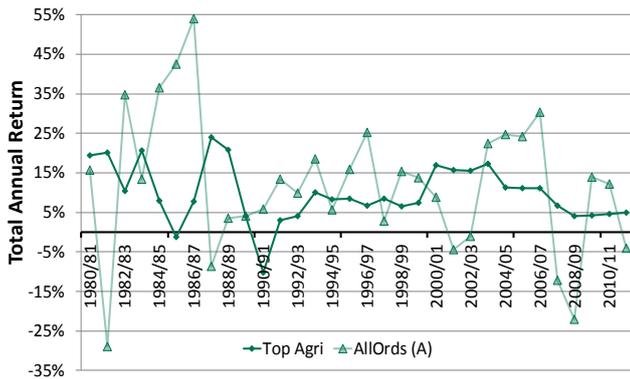


Figure 6. Chart showing the annual returns and volatility of All Ordinaries and Top 25% Agri accumulation returns

The *standard deviation* of returns is a measure of “dispersion of a set of data from the mean” (7) in other words it is a measure of volatility or risk. It is a way of quantifying the volatility we are seeing in Figure 6.

We have plotted the standard deviation of each asset class against the CAGR of each in Figure 7. This chart brings together the concepts of returns and risk.

Figure 7 shows that while equities (both Australian and international) and listed property produced higher returns than Top 25% Agri over the period considered, these asset classes were of significantly greater risk or volatility. In our opinion, given the demonstrated risk, an investor should *demand an even higher rate of return* from those asset classes to the right hand side of Figure 7 below, than they have actually delivered.

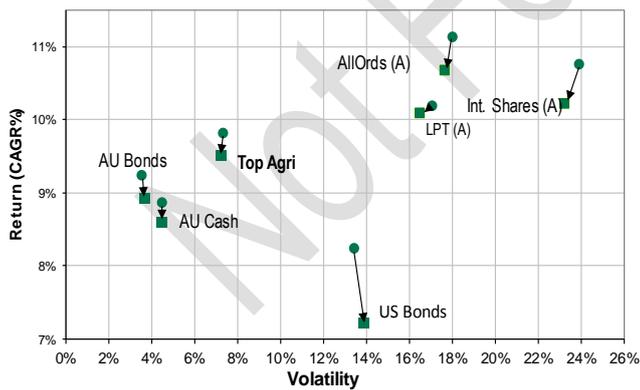


Figure 7. Chart showing the risk-return balance for each asset class.

Note: (A) = Accumulation Index, LPT = Listed Property Trusts (● = 2011 results [30yrs], ■ = 2013 results [32yrs])
(Note: the Y-axis is adjusted to make the chart easier to read)

In volatile periods, such as we have seen for the last five year, an investor may have chosen to forgo some returns for greater certainty of returns and invest in less volatile sectors such as fixed interest or, we suggest, Top 25% Agri. This will have preserved and protected investor returns. The performance of many institutional funds shows that strategies to preserve and protect

investor returns were not successful over the five years to 2012. In that period investors in Top 25% Agri would have been beneficiaries of a 25% total return, compared to investors in All Ords, at -12%. The gap of 37% is material, significant and demands re-consideration of investment into Top 25% Agri.

The Sharpe Ratio can assist in understanding the more optimum assets for investment when considering risk and return together. Put simply, the Sharpe Ratio is a measure of reward to risk. Or more specifically, it is a measure of the **risk free rate of return** for an asset compared to its volatility.

From a reward/risk perspective, the higher the Sharpe Ratio value, the better the investment. In saying this, a high Sharpe Ratio doesn't necessarily mean the highest return or the lowest risk; rather it means that that's the best you could have done when reward and risk were taken together (7).

The Sharpe Ratios for the assets review in this paper are outlined below in Figure 8.

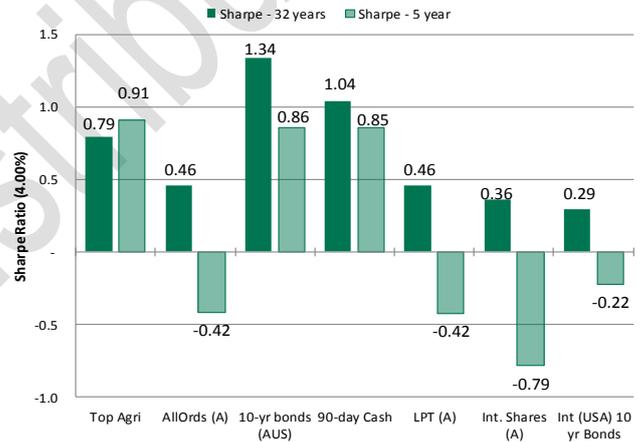


Figure 8. Sharpe Ratios over 5 and 32 years assuming risk free rate of 4.00%

Clearly, 10 year Australian Bonds and 90 cash are the better performers when considering the Sharpe Ratio, particularly over the last 32 years.

However, Top 25% Agri gives the highest risk free rate of return over the last 5 years, whilst returns for the more mainstream asset classes have suffered substantially during the Global Financial Crisis. In fact, Top 25% Agri is the only asset class which improved its performance over this period (+0.15 when compared between the 5 and 32 year ratio outcomes).

6 Is Agriculture Correlated to Other Asset Classes?

A correlation analysis was performed on the returns data for each asset class. The results are outlined in Figure 9 comparing Top 25% Agri against other asset classes.

Correlation analysis assists investors in deciding which asset classes perform in the same way, and to what extent. A correlation value of 1 indicates that two particular asset classes are exactly linked – i.e. the annual returns for each asset move exactly together – and a value of close to 1 means a strong correlation.

Low correlation between two assets means that the extent of returns from each is weakly related. A positive correlation value means that when returns for one asset class increases, returns for the other tend to increase, while a negative correlation value means that when returns for one asset class increase, returns for the other tend to decrease.

Well performing but negatively correlated assets are most useful for inclusion in investment portfolios because they help to smooth overall portfolio returns.

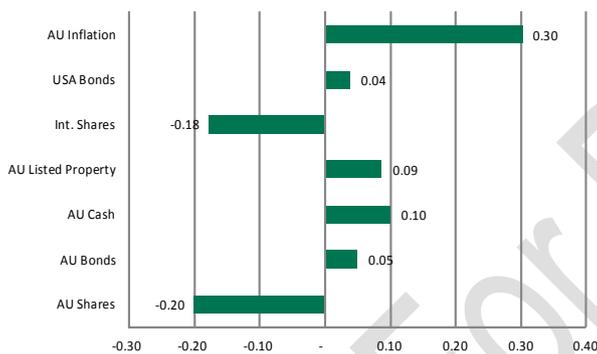


Figure 9. Correlation of Top 25% Agri versus other asset classes

The correlation illustrated in Figure 9 demonstrates that agriculture is not strongly related to any of the major asset classes used in this analysis. Agriculture shows a weak negative correlation to equities (both Australian and International; Figure 9), and a positive correlation to more stable asset classes and importantly, from a value preservation point of view, a positive correlation to inflation.

The extent to which risks can be diversified depends on the degree to which assets are correlated^(8, 9). Incorporating two asset classes into a portfolio which are negatively correlated will help to smooth out returns of the portfolio as a whole. This smoothing occurs as each asset class has different levels of risk and return and so each behaves differently over time⁽⁷⁾.

7 How Does Agriculture Impact on a Portfolio?

7.1 The Diversified Portfolio

Modern portfolio theory (MPT), first introduced in 1952, is the founding framework behind the assembly of portfolio's which maximise returns whilst simultaneously minimising risk. At the core of MPT is the concept of portfolio diversification, which in its simplest terms, relates to our favourite well known adage "don't put all your eggs in the one basket"⁽⁹⁾.

Therefore, in order to determine the real influence of including an allocation of agricultural assets (Top 25% Agri) in a diversified portfolio, we must first develop a default/base portfolio. The base portfolio we have used in this analysis was adapted from the average default strategy for Australia's 15 largest superannuation funds, as reported by the Australian Prudential Regulation Authority (APRA) in its 2012 survey⁽¹⁰⁾.

Table 1. Diversified Base Portfolio	
Asset	Weight
Australian Equities	35%
International Equities	29%
Australian Fixed Interest	10%
International Fixed Interest	7%
Cash	9%
Australian Property	10%

With this base portfolio as a starting point, we added an allocation to Top 25% Agri and reweighted the other assets in proportion, assuming a rebalancing of the portfolio each year to the relevant weighting of each class.

The influence of including Top 25% Agri in a balanced multi-asset portfolio was analysed using historical returns data to calculate risk (standard deviation) and the Compound Annual Growth Rate (CAGR).

Figure 10 below shows the risk and return resulting from the addition of Top 25% Agri, from 0-100%, plotted on the same graph for easy comparison. In this figure we can see that as the weighting of Top 25% Agri increases in a balanced portfolio, the overall investment risk lessens quite rapidly. Although the highest return is likely to be achieved at an allocation of 0%, allocating 77% to agricultural assets can more than halve the risk (13.7% to 5.8%) whilst only reducing return by 0.7%.

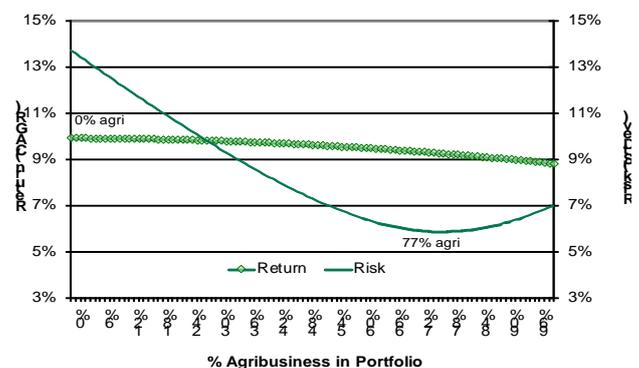


Figure 10. Chart showing the impact on risk and return, through addition of Top 25% Agri to a balanced investment portfolio (Note: the Y-axis is adjusted to make the chart easier to read)

Another means of presenting these results is shown in Figure 11, where the risk and return of each portfolio alternative is plotted against each other. This figure again reiterates the benefit of investing in agricultural assets as part of a diversified portfolio, showing that even with significant allocations to Top 25% Agri, there will be a substantial reduction in volatility, with only a marginal loss of returns.

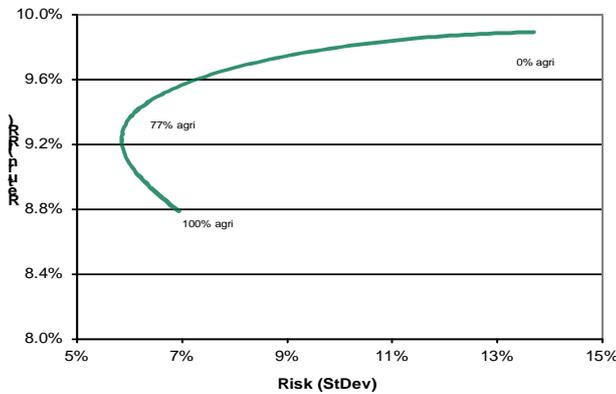


Figure 11 . Relationship between risk and return following the addition of Top 25% Agri to a balanced investment portfolio (Note: the X& Y-axis are adjusted to make the chart easier to read)

As Top 25% Agri is added to a portfolio, returns fall – but risk falls faster. From 0% to 77% Top 25% Agri, risk has fallen from approximately 14% to 6%, although returns have fallen by 0.5% from 9.8% to 9.3%. Hence, for each 0.1% fall in returns, there has been a 1.6% fall in the standard deviation of returns in the portfolio – a disproportionate gain.

For an investor seeking to de-risk a portfolio, adding Top 25% Agri achieves that goal – at up to 77% Top 25% Agri. After that, returns fall faster and risk increases.

Optimising the level of Top 25% Agri can be done generally from the chart – but more specifically from the empirical data.

7.2 The Diversified Portfolio – Optimised

From the results presented in the previous section it is fair to conclude that adding agricultural assets into a balanced portfolio is advantageous. However, the portfolio we used to generate those results could be described as a constrained portfolio, as they were calculated by reweighting a base portfolio.

The question we ask in this section is, how does Top 25% Agri influence an unconstrained diversified portfolio, the only constraints being that the allocation of each asset must be greater than or equal to zero (i.e. weight $\geq 0\%$; this means no short selling), and the total must add to 100%.

With no limit to the distribution of funds within the portfolio, there is an infinite list of potential portfolio scenarios. However, that said, there is a definite group of alternatives which are considered efficient. The expected portfolio return and investment risk of each of these efficient alternatives can then be plotted to create an efficient frontier.

We used historical returns data for the past decade (2002/03 – 2011/12) to generate the efficient frontiers shown in Figure 12, one with Top 25% Agri included as potential investment option, and the other without. Although all portfolios along the efficient frontier are, by definition, efficient, there is only one which can be described as the optimal portfolio. For the purposes of this analysis, we define the optimal portfolio as the set of allocations with the highest likely return per unit of risk (i.e. the largest Sharpe ratio).

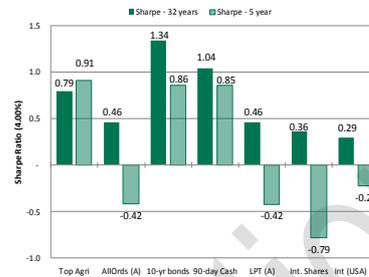


Figure 12 . Efficient frontier for an unconstrained portfolio of diversified assets showing the optimal portfolio (Note: the Y-axis is adjusted to make the chart easier to read)

Figure 12 shows that inclusion of Top 25% Agri in an unconstrained diversified portfolio shifts the efficient frontier, up and left. In terms of expected return and investment risk, this means that in almost all scenarios including Top 25% Agri will essentially assure a greater return with lower risk.

The distribution of assets within each of the optimised portfolios plotted in Figure 12, are presented in Table 2 (below) alongside the APRA diversified base portfolio. Also presented in Table 2 are the performance indicators for each portfolio over the period 2002/03 to 2011/12. As expected the optimised portfolios outperform the APRA base portfolio across all three indicators computed.

Table 2. Unconstrained Diversified Portfolio Analysis			
Asset	APRA Base	Optimised Without Agri	Optimised With Agri
Top 25% Agri	0.0%	0.0%	21.7%
AU Shares	34.7%	24.9%	0.0%
AU 10-yr bonds	9.9%	0.0%	43.2%
AU Cash	8.6%	75.1%	35.0%
AU Property	10.2%	0.0%	0.0%
INT Shares	29.3%	0.0%	0.0%
INT 10 yr Bonds	7.3%	0.0%	0.0%
Expected Return	4.6%	6.2%	6.1%
Standard Deviation	9.8%	1.4%	1.3%
Sharpe Ratio	-0.02	0.99	1.07

Optimised for portfolio distribution with largest Sharpe Ratio (only constraint, no short selling)

Using the Sharpe Ratio (SR) to compare these three very different portfolios, enables us to determine if the portfolio performance is the result of smart investment strategy, or simply the result of a higher level of risk.

Interestingly, despite both portfolios being optimised to maximise the SR, the results indicate that when Top 25% Agri is included as an alternative investment option, the risk-adjusted performance of the optimised portfolio is improved by 8%.



8 Conclusions

If the goal of a portfolio of investments is to create steady, reliable and reasonable returns, then the inclusion of Top 25% Agri does just that. A portfolio without the benefit of inclusion of Top 25% Agri will conversely be more volatile, particularly during challenging economic periods.

Top 25% Agri has been overlooked by many institutions and professional investors for a range of reasons. The perception of climatic and operational risk and the lack of performance by many asset managers are two cited reasons. The truth is that whilst much of agriculture fails to perform, the top end is clearly investible. Few sectors offer the intelligent investors such a range of opportunities to drive returns at low risk.

This paper continues to debunk the myth that all agricultural investment in Australia is a failure. Clearly, there are substantial segments which outperform other sectors, which deliver reliable and attractive returns, and do so at comparatively lower risk. These are the facts which international investors are increasingly recognising, but which many Australian institutions and investors choose to largely ignore.

9 About AAG and Contact Details

Australian Agribusiness Group was formed in 1997 and provides expertise in research, investment management consulting.

AAG is a leading provider of research into agricultural investments in Australia.

Through AAG Investment Management, we source and manage a substantial portfolio of Australian farmland investment for a select group of domestic and international clients.

AAG undertakes commissioned research and consulting projects where we see that our work will be relevant and will add value.

AAG only works in and with agribusiness and particularly the commercial aspects of this dynamic sector.

For more information about AAG, please visit our websites at www.aagc.com.au and www.aagim.com.au.

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