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**The Influence of Farm Management on NSW Rural Property Income
and Total Average Annual Returns**

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Abstract

The importance of agriculture in many countries has tended to reduce as their economies move from a resource base to a manufacturing industry base. Although the level of agricultural production in first world countries has increased over the past two decades, this increase has generally been at a less significant rate compared to other sectors of the economies.

Despite this increase in secondary and high technology industries, developed countries have continued to encourage and support their agricultural industries. This support has been through both tariffs and price support.

Following pressure from developing economies, particularly through the World Trade Organisation (WTO), GATT Uruguay round and the Cairns Group developed countries are now in various stages of winding back or de-coupling agricultural support within their economies.

A major concern of farmers in protected agricultural markets is the impact of a free market trade in agricultural commodities on farm incomes, profitability and land values.

This paper will analyse both the capital and income performance of the NSW rural land market over the period 1990-1999. This analysis will be based on several rural land use classifications and will compare the total return from rural properties based on the farm income generated by both the average farmer and those farmers considered to be in the top 20% of the various land use areas. The analysis will provide a comprehensive overview of rural production in a free trade economy.

Introduction

The management ability of a farmer is the main factor that will determine the profitability of the rural property at any given seasonal conditions and at any given commodity price.

Like all businesses the success of the rural property is dependent on the ability of the operator to make the correct decisions in relation to the type of livestock to run, the types of crops and pastures to be grown and the appropriate time to sell that produce. To run efficiently a property has to be well a managed, with farm management not being solely focused on the actual ability to manage the technical aspects of animal husbandry or agronomy but also the marketing and financial management of the property.

Most comparative data provided in relation to the financial returns from rural production is based on the average annual returns of all rural properties over a given time period.

This method of reporting farm income returns does not give a true indication of the financial performance of all farmers in any given rural production market and in fact can give a very disproportionate view of the difference in farm management ability and financial performance across the farming sector.

Isolating the better farmers from the average rural producers allows a better comparison of this property class to other investment property types and property investment indices that are based on the returns from institutional investors, with these returns being generated from the top commercial, industrial and retail property.

Rural Property Returns

There has been limited research into rural land investment performance throughout countries with a large rural industry. Although there are regular some publications analysing the trends for rural land in the United States of America, generally on an annual basis, the number of these publications is still considerably less than for the other forms of property (Gilliland, 1986, 1996; Gilliland and Semien 1997). There has also been rural land research in the USA in relation to rural land returns and the performance of this property market sector as an integral part of an investment portfolio (Lins, Sherrick and Venigalla, 1992; Roulac, 1978), with this particular research being based on the NCREIF Farmland Index, which is based on the income and capital returns of farms owned by large corporate institutions, which are not always representative of all agricultural producers in a market.

In Australia rural land performance research has been limited to Collins (1959), McPhillamy (1969, 1972), Edwards (1994) and Eves (1997, 1998, 1998a, 1999, 2000, 2001). Only the studies by Eves have been based on a complete sales transaction database, with the other studies being based on very small areas or benchmarking of specific rural properties.

In addition to the above research on rural land trends, numerous U.S. State based universities compile annual rural land price information for their individual States.

Several of these indices are transaction based e.g Iowa State University (2000), Purdue University (2000) and Cornell University (2000). In addition several U.S. universities also compile an annual rural land price index based on the survey of farm credit providers, appraisers and rural property brokers and farm managers (Florida State University, 2001; and University of Georgia, 2000). All these surveys are based only on capital returns and do not reflect the income potential of the various levels of farm management.

Rural land studies in the United Kingdom (UK) are also limited in relation to the research for the other forms of property in the UK property market. Again, the focus of rural land research in the UK is based on general rural land price trends and returns, rather than the factors that are influencing these price trends (Clayton, 1984; Trumper, 1984; Estates Gazette, 1994, 1995, 1996; Paice 1992).

The majority of the studies undertaken in relation to rural land capital and total returns has been based on aggregating all rural land use types to determine an overall average. Although this does provide a general view of the economic and capital gain performance of rural property, it does not make any allowance for the various rural land use classifications that differentiate the rural producers in any given rural property market.

This study has been undertaken to:

- Determine the average annual capital, income and total return for NSW farmers
- Compare the income, capital and totals return performance of farmers in the three main rural land use classifications in NSW.
- Differentiate income return and total return performance of rural property based on the management ability of the farm operator.

Research Methodology

All the capital return data has been based on the previous analysis of the NSW rural land market carried out by Eves (1996, 1997, 1998, 1998a, 1999, 2000 and 2001). These studies have resulted in the development of a rural land performance index, providing extensive details of the capital and total return performance of rural land in the State of New South Wales, Australia. NSW accounts for over 35% of the total agricultural production in Australia, therefore the results of these studies are representative of agricultural income and capital returns in Australia (ABARE, 2001).

This capital return index is based on over 30,000 rural sales transactions over the period 1990-2000, and covers all rural sales in New South Wales based on Local Government Areas, allowing the index to differentiate capital returns in respect to rural land use, geographic location and climatic conditions.

Farm income data has been sourced from the Australian Bureau of Agriculture and Resource Economics (ABARE) reports. Each year farmers in Australia are required to complete a detailed farm financial survey. ABARE and the Australian Bureau of Statistics use this annual survey information to generate several reports on agricultural

production in Australia. The ABARE report that has been used in this analysis is the “Farm Survey Report”.

The Farm Survey report provides income data, based on both Australian composite information, individual State composite information and on rural land use information.

Although the ABARE data covers most individual rural production commodities, these individual rural commodity survey data sets are not always defined in relation to geographic location. However, the ABARE reports do identify three rural land use classifications based on the Local Government Areas of NSW, which can be used directly with the capital return data. These rural land use classifications are and comprise:

- High rainfall rural farm production
- Mixed farming rural production
- Pastoral rural production

In addition to the three rural land use classifications this paper will also include an analysis of the NSW rural property market on a total return basis. This analysis has been weighted to reflect the number of NSW farms included in the three rural land use classifications.

The ABARE Farm Survey reports provide a full breakdown of rural farm income and expenditure received over the 12-month period of each survey. This is actual income return data and reflects the impact of seasonal conditions on agricultural production and the prevailing agricultural commodity prices obtained throughout the 12-month period of each annual survey.

Survey details also include an allowance for the cost of the owner/operators wages over the 12-month period. The allowance has been excluded from the annual net profit calculations for each rural land classifications to reflect the true operation costs of a rural property..

All ABARE farm survey data has been based on the average returns from over 22,000 NSW farm properties. The income returns include a significant range in the management ability of the farmers participating in the annual rural survey. According to the Australian Bureau of Statistics, less than 20% of Australian farmers generate over 50% of total farm income and profit over a 12-month period. Based on this statistic the average farm net profit and income return, based on all farmers financial results is not a true indication of the total return performance of the top 20% of NSW farmers.

NSW Rural Property Composite Income and Total Returns

The following analysis of the total returns from rural land in NSW is based on the three ABARE rural land use classifications of high rainfall (coastal and tableland regions), mixed farming classifications (slopes and plains regions) and pastoral (Western Division regions). However, for comparison purposes the analysis and

discussion of the total return performance of these rural land use classifications; will also include the data and performance measures for the NSW composite rural property market as a benchmark.

The income return data for the NSW composite rural property market for both the average farmer and those farmers considered to be the top 20% are included in Table 1. This table shows the relevant ABARE farm survey results for the farming calendar years of 1990 to 2000.

The annual average farm net profits for rural properties in NSW have been added to the average annual change in livestock values to determine the per annum net income represented in Tables 1 and 2. This net income has been used as the basis to determine an average annual period net income per hectare for the average of all rural land uses in NSW, based on both the NSW average farmer and the top 20% of farmers in the State.

For comparison purposes the annual survey data has been presented in this report on the basis of average farm area, the annual allowance for owner/operator wages, the annual net profit per hectare after the deduction of the owner's wages/labour (before taxation and finance costs).

Table 1. ABARE NSW Farm Survey Results

Year	Average Farm Survey Area (hectares)	Annual Allowance Owners Labour (\$)	Annual Net Income/ha (\$) NSW Average	Annual Net Income/ha (\$) NSW Top 20%
1990	1923	27650	28.91	98.58
1991	2053	27970	11.50	39.22
1992	2181	28545	5.83	19.88
1993	2805	29473	3.14	10.71
1994	2339	29540	10.53	35.91
1995	2272	32763	11.67	39.79
1996	2284	33090	8.98	30.62
1997	2276	32817	14.13	48.18
1998	1965	34997	12.30	41.94
1999	1957	35150	14.73	50.22
2000	2180	35800	19.11	65.17

Table 8.1 shows that the annual average allowance for rural property owners' labour and wages in 1990 was \$27,650, rising to an annual figure of \$35,800 in 2000. This represents an increase of 29% over the eleven-year period, at an average annual increase of 2.64%. During this same period, the inflation rate in Australia averaged 2.38% (Reserve Bank of Australia, 2001), therefore the increase in the value of rural property owners' wages and labour has been greater than the inflation rate and a genuine indication of the cost of this expense.

Agriculture in Australia is based on a free world trade, therefore subject to variable commodity prices as well as significant variation in production levels due to seasonal conditions. This is reflected in the average net income profits received by NSW

farmers in the period 1990 to 2000. During this period, the average net farm profit per hectare ranged from a low of \$3.14 in 1993, to a maximum of \$28.91 for 1990. As the income data is based on the financial year, the 1990 income included the income from the record December 1989/January 1990 harvest, which occurred prior to the start of the mid 1990 rural recession. Over the period of this study the average annual net profit per hectare for the average NSW rural property was \$12.80, with a standard deviation of \$6.85 reflecting the significant variability of this annual net profit income stream generated by the average farmer in Australia.

Table 2 also shows that based on the management ability of the top 20% of farmers in NSW, the net profit per hectare increases significantly. The lowest per hectare net profit for this class of NSW farmer is \$10.71 in period 1993, with the highest net annual profit per hectare being \$98.58 in 1990. During the period 1990 to 2000, the scenario average net profit per hectare for the top 20% of farmers has been \$43.65.

Increased levels of farm net profits for the above average farm operators also results in a considerably higher income return on an annual basis. Table 2 indicates that the income return for the top 20% of all NSW rural properties has ranged from a low of 2.08% in 1998 and a highest annual period income return of 4.71% in 1992

Table 2: Comparison of Performance Returns: Average NSW farmers v Top 20% NSW Farmers: 1990-2000.

Year	NSW Average			NSW Top 20%		
	Capital Return	Income Return	Total return	Capital Return	Income Return	Total return
1990	-2.85	1.71	-1.14	-2.85	4.48	1.63
1991	17.46	1.43	18.89	17.46	4.20	21.66
1992	4.19	1.75	6.94	4.19	4.71	8.90
1993	7.73	1.2	8.93	7.73	2.92	10.65
1994	9.62	0.43	10.05	9.62	2.37	11.99
1995	6.12	1.52	7.64	6.12	3.81	9.93
1996	8.51	1.41	9.92	8.51	3.74	12.25
1997	12.88	0.81	13.69	12.88	2.35	15.23
1998	12.21	0.79	13.0	12.21	2.08	14.29
1999	-1.57	1.26	-0.31	-1.57	3.86	2.29
2000	22.99	1.03	24.02	22.99	2.92	25.84

Isolating the income return from only the better farm operators has also significantly increased the average annual income return over the period January 1990 to December 2000 to 3.40% compared to 1.21% based on the overall NSW rural producer average.

These low annual income returns for the average NSW composite rural property market have resulted in only a minor increase in the annual total return compared to the annual capital returns. This reflects the situation that the greatest component of total returns for the average farmer in Australian agriculture is the capital gain for the rural property not the income generated from the property.

Figure: Comparison of Annual Total Returns: 1990-2000: Average v Top 20% NSW Farmers

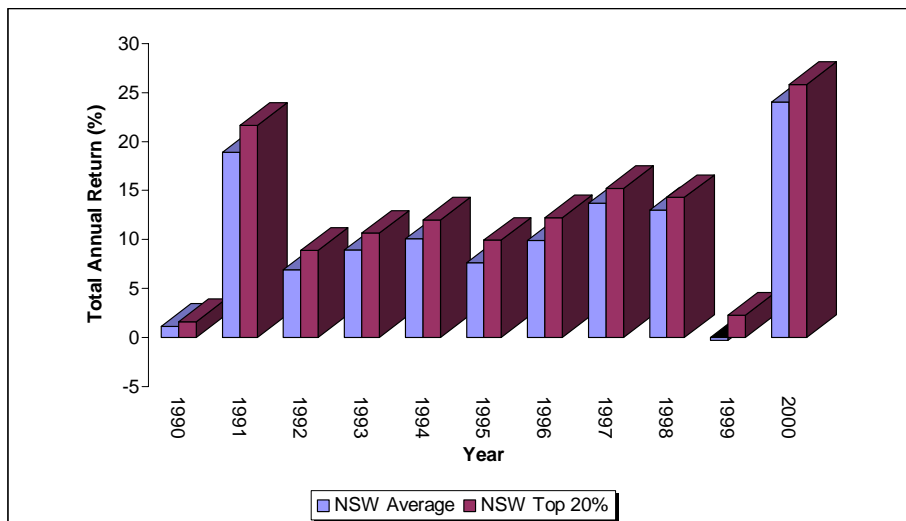


Figure 1 also shows that the difference in the average annual total return between the average NSW farmer and the best farmers in NSW is minimal, despite the greater difference in annual income return. However, it is interesting to note that the greatest differences in the total returns of the average farmer and the best 20% of farmers has occurred in 1992, 1995 and 1999, all years that were subject to low production yields or commodity prices (Eves, 2000 & 2001, ABARE 2001). This suggests that the better farmers can limit their potential for income losses during rural downturns, which improves their long-term economic viability.

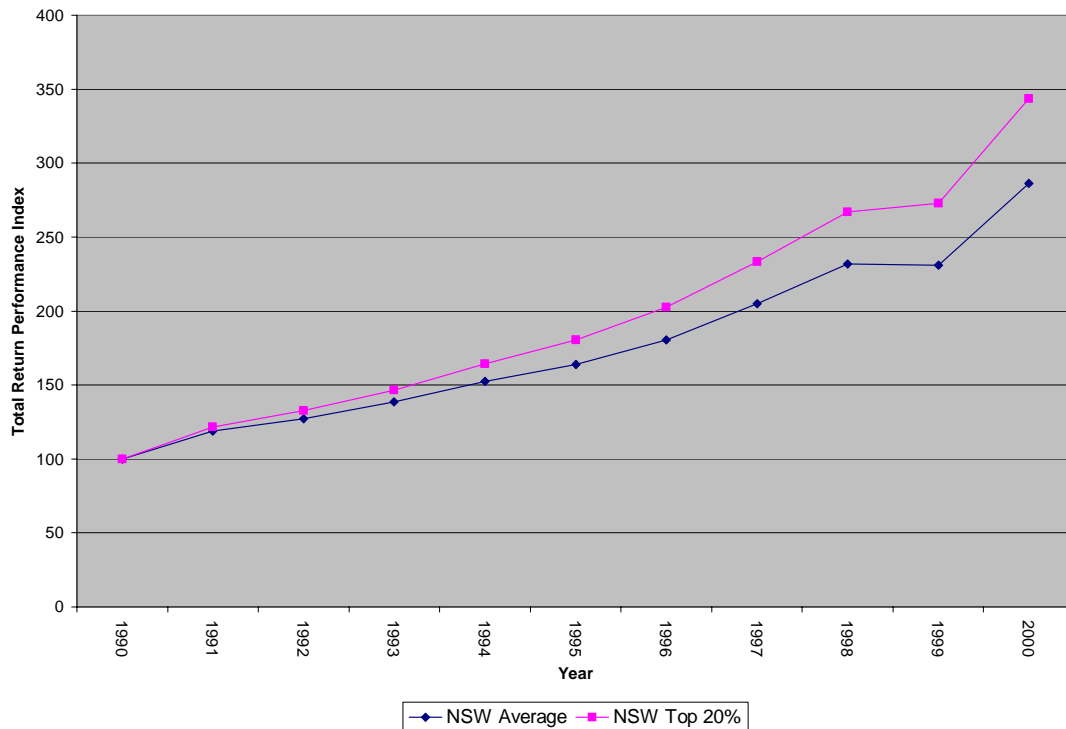
The total return performance index of the average NSW farmer and the top 20% of farmers in NSW is shown in Figure 2. This figure confirms that over the period 1990-2000, the investment return performance of the top 20% of farmers in NSW has been significantly greater than the overall average rural property performance for the State. During the same period that the NSW average rural property total return investment index has increased from a base of 100 to 286, the index for the top 20% of farmers has increased from 100 to 343 over the same period.

Both indices are following a similar trend due to the fact that the only variation is in the actual income return, with the capital returns being identical for both groups.

Agriculture in NSW is carried out across a wide range of climatic areas, ranging from sub-tropical agriculture in the north east, temperate agriculture in the central areas, semi-arid agriculture to the west and alpine agricultural areas to the south east. Virtually all agricultural crops and livestock can be produced or run in this one State of Australia (NFF, 1995).

This variation also results in a wide range of income and totals annual returns for the various types of agricultural production undertaken in NSW. The analysis and discussion to-date has focused on the NSW average rather than actual land use.

Figure 2 Total Return Performance Index: 1990-2000: NSW Average v NSW Top 20%



Comparison of Management Performance based on Rural Land use

The following analysis and discussion is based on the capital and income returns for the three ABARE rural land use classifications, to which an adjusted net profit has been determined for the above average farmer. This adjusted net profit for the top 20% of NSW farmers has been calculated to be 3.06 times the current average annual net profit before tax and finance charges for all three rural land uses areas.

Isolating specific rural land uses has been carried out to examine the profitability of these farm types over the period 1990-2000, and to determine if actual rural land use has resulted in any significant variations compared to the NSW composite results. The rural land uses will be compared on the basis of the NSW average and the top 20% of farmers in that particular rural land use area.

High Rainfall Rural Land Use Total Return Comparison

Determining high rainfall rural land use net profit on the basis of the top 20% of rural property producers for this rural land use has resulted in reasonable increases in annual net profit per hectare. Table 3 and figure 3 shows that the top 20% of farmers

in this land use classification recorded a lowest net income return of 0.39% in 1991, compared to the average farmer lowest income return of 0.14% and 0.15% in 1990 and 1991. The highest annual net income return recorded for the average farmer in this land use classification was 1.58% in 1999, the top 20% of farmers actually recorded annual income returns in excess of 1.58% in all years except 1990 and 1991, with a highest annual income return of 4.33% in 1996. Despite the higher annual income returns generated by the better farmers in High rainfall areas of NSW, both groups still recorded negative total annual returns in 1992, 1995 and 1996.

Table 3 Comparison of Performance Returns: Average High Rainfall Farmers v Top 20% High Rainfall Farmers: 1990-2000.

Year	High rainfall Average			High rainfall Top 20%		
	Capital Return	Income Return	Total return	Capital Return	Income Return	Total return
1990	2.74	0.14	2.88	2.74	0.79	3.53
1991	14.11	0.15	14.26	14.11	0.39	14.5
1992	-6.43	1.18	-5.25	-6.43	1.91	-4.52
1993	7.47	1.17	8.64	7.47	3.66	11.13
1994	13.04	0.78	13.82	13.04	2.51	15.55
1995	-7.93	0.96	-6.97	-7.93	1.87	-6.06
1996	-9.51	1.51	-8.00	-9.51	4.33	-5.18
1997	8.67	0.59	9.26	8.67	1.62	10.29
1998	9.60	0.88	10.48	9.60	2.30	11.9
1999	5.64	1.58	7.22	5.64	4.29	9.93
2000	9.56	0.80	10.36	9.56	2.23	11.79

However, the higher farm income per hectare figures achieved by the top 20% of farmers in the High rainfall areas limited the negative total returns that were experienced by the average farmer in the same locations.

Figure 3 also shows that the greatest impact of the higher farm incomes of the better farmers were in the years 1993, 1996 and 1999, which were all years recording below average annual capital returns.

Despite the significant increase in the annual net profit per hectare for high rainfall areas in NSW, based on this scenario of comparing the average for the land use to the top 20% of farmers in the same land use of High rainfall, the higher annual price per hectare for this rural land use has resulted in this increased net profit having only a limited influence on overall income returns, compared to the NSW average.

This can be explained in part by rural properties in these areas also being purchased by people seeking a rural lifestyle rather than undertaking full time farming operations (Eves, 1997).

Figure 3 Comparison of Annual Total Returns: 1990-2000: Average High Rainfall v Top 20% High Rainfall

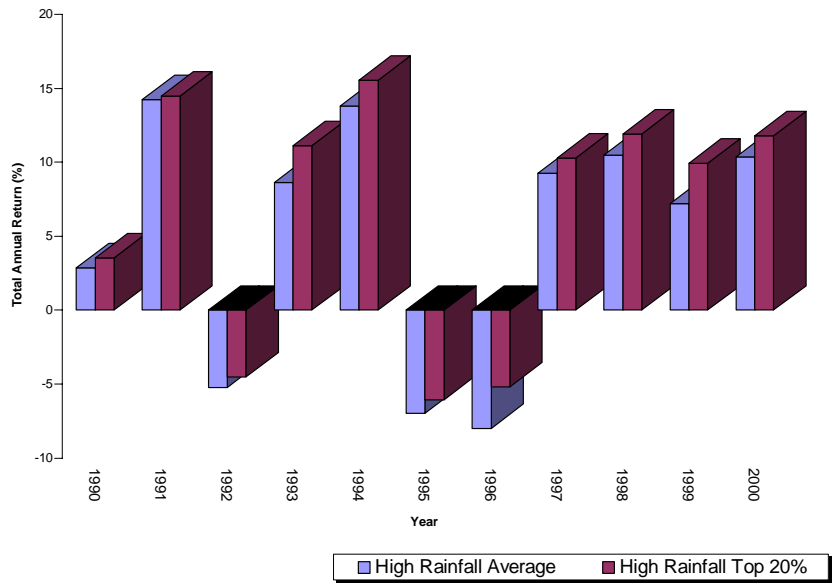
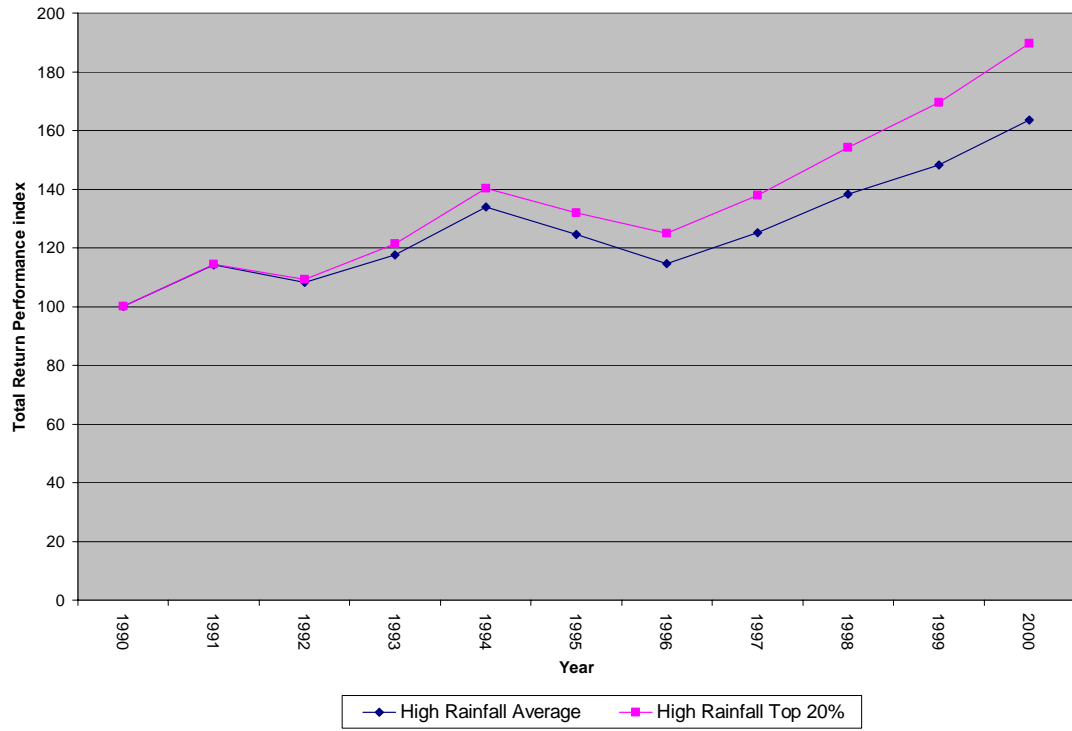


Figure 4 Total Return Performance Index: 1990-2000: High Rainfall Average v High Rainfall Top 20%



In Figure 4, it can be seen that the total return investment performance for the average farmer in the high rainfall areas and the top 20% of farmers in the same area were

very similar from 1990 to 1994. However since 1996 the top 20% of farmers in the high rainfall areas have outperformed the average farmer significantly.

Since 1996 the index for the top 20% of farmers in the high rainfall areas has increased from 125 to 190, while the average index shows a more modest increase from 115 to 164.

Mixed Farming Rural Land Use Total Return Comparison

In the analysis of the average annual total return for mixed farming rural areas in NSW, it was found that this rural land use had the highest annual net profit per hectare and the highest annual income return compared to high rainfall, pastoral land use areas and the overall NSW rural land weighted average.

In Table 4 it can be seen that the application of the top 20% scenario net farm profit calculations result in considerably higher annual net profit per hectare. This Table shows that while the highest income return achieved by the average farmer in the mixed farming land use areas was 5.69% in 1996, in the same year the income return for the top 20% of mixed farm enterprises was 15.13%.

Table 4 Comparison of Performance Returns: Average Mixed Farming v Top 20% Mixed Farming: 1990-2000.

Year	Mixed Farming Average			Mixed Farming Top 20%		
	Capital Return	Income Return	Total return	Capital Return	Income Return	Total return
1990	-10.36	1.82	-8.54	-10.36	5.51	-4.85
1991	16.34	1.94	18.28	16.34	5.73	22.07
1992	10.00	3.85	13.85	10.00	11.63	21.63
1993	4.74	2.69	7.43	4.74	7.60	12.34
1994	5.70	1.75	7.45	5.70	6.06	11.76
1995	-6.83	3.63	-3.2	-6.83	13.11	6.28
1996	9.69	5.69	15.38	9.69	15.13	24.82
1997	7.33	3.68	11.01	7.33	11.56	18.89
1998	12.29	3.32	15.61	12.29	9.36	21.65
1999	0.33	2.36	2.69	0.33	7.96	8.29
2000	5.34	2.97	8.31	5.34	8.68	14.02

Over the period 1990-2000, the lowest income return recorded by the top 20% of farmers in the mixed farming areas was 5.51%, which is only slightly less than the best figure recorded by the average rural property operator in mixed farming areas.

Overall, for the 11 annual periods from 1990 to 2000, the average annual income return for the best farmers in mixed farming areas was 9.30%, which is greater than the highest annual income return achieved by the high rainfall and pastoral rural land uses as well as the NSW rural land weighted average during the period January 1990 to December 2000.

The impact of the very significant variations in annual income returns is shown in Figure 5, which compares the total annual returns for the average farmer in mixed farming areas and the top 20% of farmers in the same areas.

Figure 5 Comparison of Annual Total Returns: 1990-2000: Average Mixed farming v Top 20% Mixed Farming

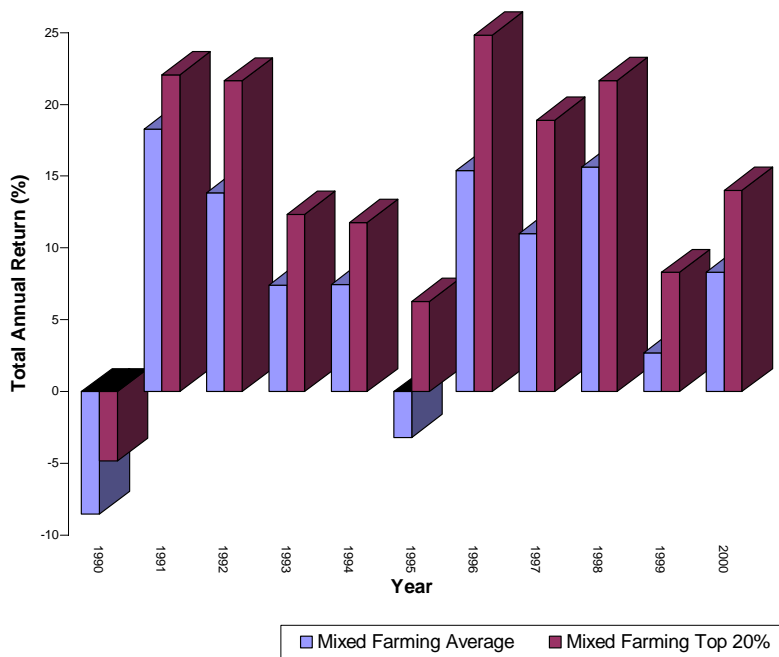
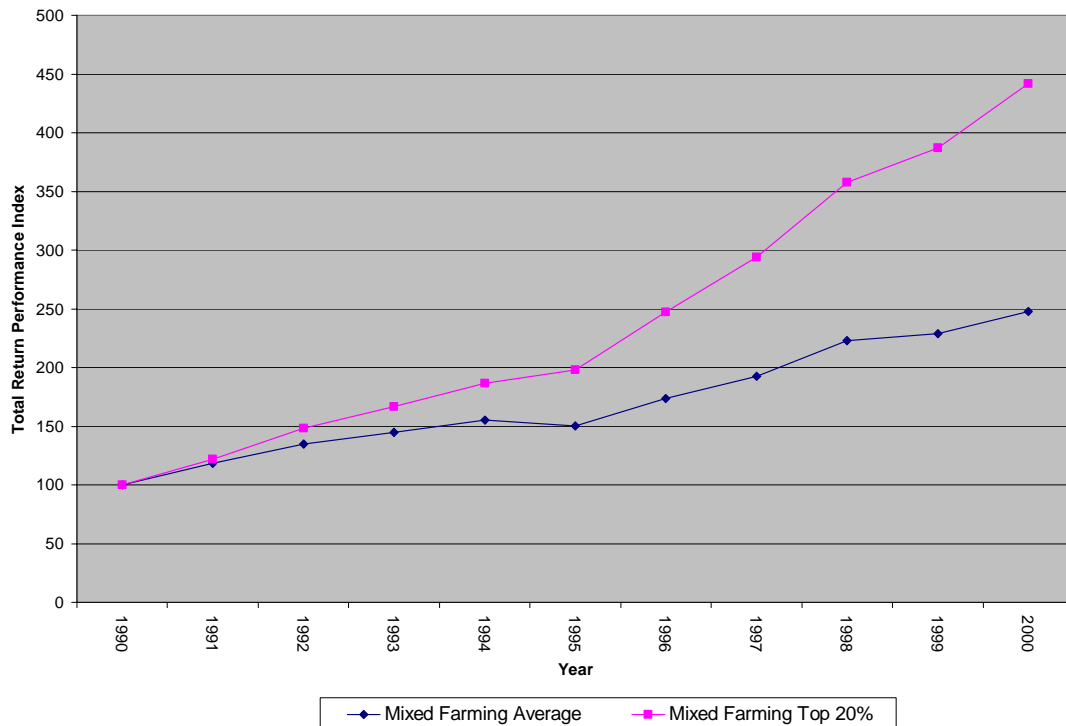


Figure 5 shows that in every year from 1990-2000, the top 20% of farmers in mixed farming areas have recorded significantly higher total returns, with the higher income returns in 1995 actually resulting in the top 20% of these particular farmers recording a positive total return, whereas all other farmers in mixed farming areas recorded a negative total return for that year

The investment performance indices shown in Figure 6 also support the very strong total return performance of the top 20% of farmers in the mixed farming areas of Australia. During this period the investment performance index for these farmers increased from the base level of 100 in 1990 to 442 in 2000.

Over the same period the investment performance index for the average mixed farming rural producer rose from the base of 100 to 248. The income returns from the average mixed farming operator were well above the high rainfall and pastoral area farmers and in fact the total returns performance for the average farmer in mixed farming areas has shown a higher total return than both the best farmers in the high rainfall and pastoral areas.

Figure 6 Total Return Performance Index: 1990-2000: Mixed farming Average v Mixed Farming NSW Top 20%



8.7.3: Pastoral Rural Land Use Total Return Comparison

Although the income return per hectare is lower than that achieved by both high rainfall and mixed farming regions, the large area of farms in these farms (average 55,000 hectares [ABARE,2001]) does result in an overall significant net profit per farm operation in these semi-arid regions.

Again, there is a considerable difference between the annual income return of the top 20% of farmers in the pastoral land use areas are compared to the average farmer in the pastoral areas of Australia.

Table 5 shows that the average farmer in the pastoral regions achieved a maximum income return of 1.12% in 1990, with a low of 0.26% in 1993. During the same period the highest income return achieved by the top 20% of farmers in the pastoral regions was 3.24% in 1990 and a lowest return for the period 1990-2000, was 0.70% in 1993.

The annual income returns for pastoral land were not sufficient to offset the negative capital returns for these corresponding periods, therefore not providing the same benefits to semi-annual total returns as was the situation with the mixed farming land use (refer to Figure 7).

Table 5 Comparison of Performance Returns: Average Pastoral Farmers v Top 20% Pastoral: 1990-2000.

Year	Pastoral Average			Pastoral Top 20%		
	Capital Return	Income Return	Total return	Capital Return	Income Return	Total return
1990	-3.10	1.12	-1.98	-3.10	3.24	0.14
1991	-20.73	0.58	-20.15	-20.73	1.59	-19.14
1992	-3.46	0.50	-2.96	-3.46	1.21	-2.25
1993	5.59	0.26	5.85	5.59	0.70	6.29
1994	-19.44	0.67	-18.77	-19.44	2.09	-17.35
1995	66.61	0.50	67.11	66.61	1.65	68.26
1996	20.46	0.46	20.92	20.46	1.09	21.55
1997	-4.39	0.85	-3.54	-4.39	2.09	-2.3
1998	28.27	0.83	29.1	28.27	1.77	30.04
1999	-48.23	0.95	-47.28	-48.23	2.56	-45.67
2000	127.51	0.69	128.2	127.51	1.84	129.35

Figure 7 also shows that the relatively small differences between the incomes generated by the top 20% compared to the average farmer in the pastoral land use areas, resulted in very minimal differences between the total annual returns of the two groups.

Figure 7 Comparison of Annual Total Returns: 1990-2000: Average Pastoral v Top 20% pastoral

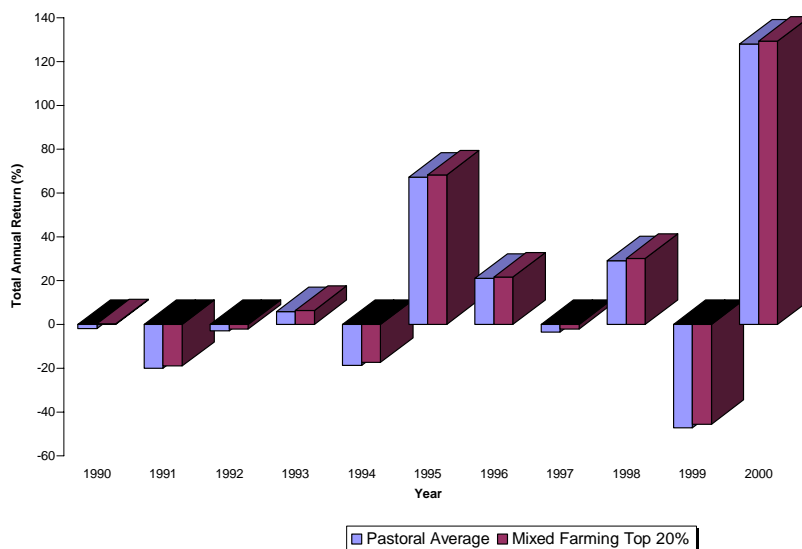


Figure 8 Total Return Performance Index: 1990-2000: Pastoral Average v Pastoral Top 20%



There is no single annual period between 1990 and 2000, where the annual total returns between the two groups were significant. This can be attributed to the dominance of the capital returns in these pastoral areas due to the low annual income returns.

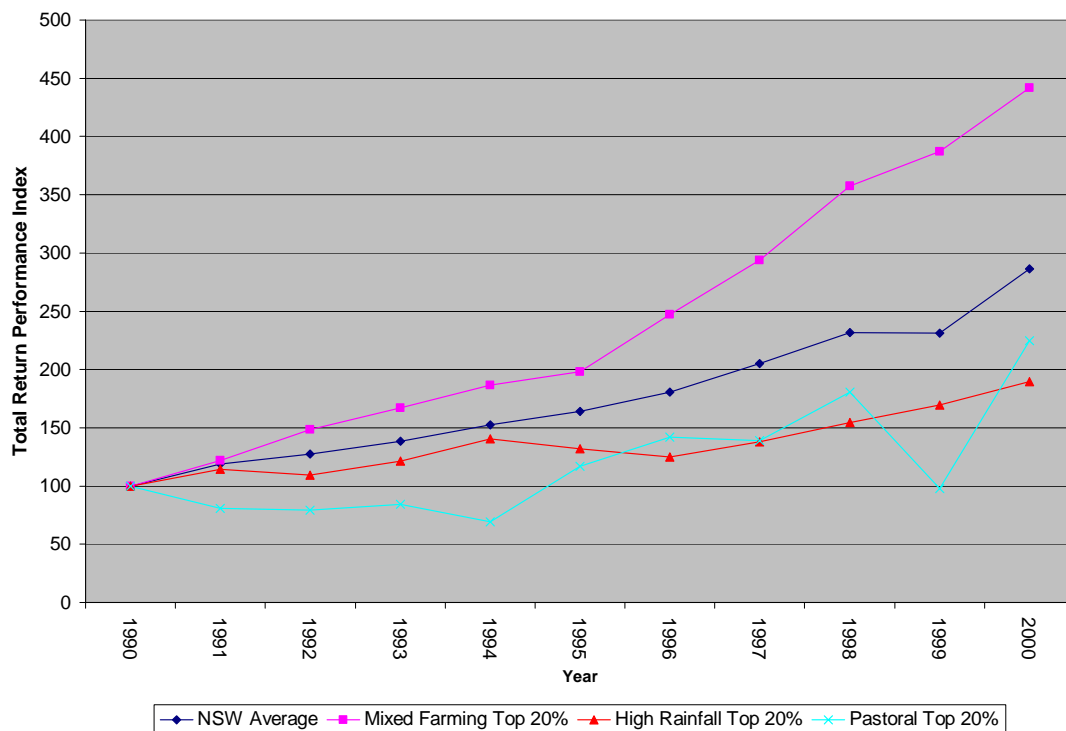
This is also supported by the annual total return investment performance represented in Figure 8. Over the period 1990-2000, the performance index of the average farmer in the pastoral regions has increased from a base of 100 in 1990 to 202 in 2000. Over the same period the total return performance index for the top 20% of farmers in the pastoral land use classification increased from 100 to 225.

Land Use Total Return Comparison

The following is a direct comparison of the annual income and total returns based on the three (3) ABARE rural land use classifications.

Figure 9 represents the annual total return indices for the top 20% of farmers in high rainfall, mixed farming and pastoral land use areas of NSW for the period January 1990 to December 2000, compared to the NSW average farmer.

Figure 9 Total Return Performance Index Comparison: 1990-2000: NSW Average, High Rainfall Top 20%, Mixed Farming Top 20% and Pastoral Top 20%



The higher annual net profits for all the three (3) ABARE rural land use classifications based on the top 20% of farmers resulted in a substantial increase in annual income returns. The annual income returns based on the top 20% of NSW farm operators show that mixed farming has performed well in excess of the high rainfall and pastoral land uses. During the period 1990-2000 the best farmers in the high rainfall and the pastoral areas did not achieve the same levels of total return investment performance as the average NSW farmer. This can be explained to some extent by the fact that mixed farming is the dominant land use in NSW and makes up the greatest proportion of farm numbers in the ABARE Farm Survey report (ABARE, 2001). However, the volatility of the mixed farming annual income returns has been greater than the volatility of the annual income return for the other two NSW rural land uses (refer to Table 7).

The higher capital returns for the pastoral areas of NSW continues to dominate the annual total returns for the periods from January 1990 to December 2000, despite the increased income returns for all NSW rural land uses on the top 20% of NSW farmers scenario.

Figure 9 also shows that the total return performance of the top 20% of high rainfall area farmers was very similar to the NSW average farmer until 1994, when there were two years of negative total annual returns for all farmers in the high rainfall areas, due to significant falls in capital values.

Although the pastoral total return investment performance index finished in period 2000 at a similar level to the high rainfall total return investment performance index (190 and 225 respectively), their performance on an annual basis still remained very different on the scenario basis. The total return investment performance for high rainfall areas of NSW was still less volatile than the total return investment performance for pastoral land, due to both these rural land uses having very low levels of annual income return, with the volatility being driven by the annual change in rural land prices.

Tables 6 and 7 represent the all farms average annual total returns and the volatility of these returns over time, based on the NSW average annual return for the high rainfall, mixed farming and pastoral land uses in NSW together with the average annual total returns based on the income returns for the top 20% of NSW farms in the three (3) rural land use classifications.

From these tables it can be seen that based on the total returns for all farms, pastoral land has shown an average annual total return of 15.35%, with a volatility of 35.90%. This average annual total return is considerably higher than mixed farming 9.94% and high rainfall 5.56%, however the volatility for the mixed farming and the high rainfall areas is also considerably less than pastoral land use areas at 10.32% and 7.57% respectively.

Table 6. Average Annual Total Returns: Average Farmers v Top 20% Farmers: 1990-2000

Rural Land Use	Annual Total Return (Average) [%]	Annual Total Return (Top 20%) [%]
High Rainfall	5.56	7.21
Mixed Farming	9.94	15.26
Pastoral	15.35	16.51

Although all three rural land use areas show an increase in average annual total returns based on the inclusion of only the top 20% of rural farms for each land use classification, this increase has not been consistent across the land use classifications.

While the average annual total returns for high rainfall areas and pastoral areas increased by 1.65% and 1.19% respectively, the increase in the average annual total return for mixed farming areas increased by 5.32%.

Table 7. Average Annual Volatility of Total Returns: Average farmers v Top 20% Farmers: 1990-2000

Rural Land Use	Volatility Over Time (Average) [%]	Volatility Over Time (Scenario) [%]
High Rainfall	7.57	7.48
Mixed Farming	10.32	8.00
Pastoral	35.90	35.85

Changes in the volatility of the average annual total returns for the pastoral and high rainfall areas were also not as significant as the impact of the scenario analysis on the volatility of the average annual total return for mixed farming areas of NSW. Table 7 shows that the additional income per annum generated by the best farmers in the high rainfall and pastoral areas of NSW only marginally reduces the volatility (0.09% and 0.05% respectively), however over the same time period the reduction in the annual volatility of the average annual total returns for mixed farming falls by 2.32% under the best farm scenario.

Conclusions

Farm management and rural land use are the major factors that will determine the potential total return that can be generated from rural property. This study has shown that in all rural land use classifications the better rural property managers will always achieve a higher income return compared to the average farmer due to the ability of the better farm operator to achieve both higher production yields and higher prices due to the better quality of rural commodities produced.

These results have significant ramifications in relation to the potential of rural property in investment portfolios, as the correct selection of the type, location and operator for a rural investment property will determine the total return that can be achieved from the rural property.

Although the period of the study is relatively short (11 years), it is interesting to note the effect of rural land use on overall farm profitability. The study shows that mixed farming has been the most profitable rural land use in NSW over the period 1990-2000. The average mixed farm in NSW actually had a greater income return per annum, than the best 20% of farmers in the high rainfall and pastoral areas of NSW. This in part can be explained by the high grain prices received by Australian farmers from the mid to late 1990's and the low wool prices received by graziers from the early to late 1990's. Over time, it can be expected that these results will change as the price of various rural commodities change. This also has implications in relation to the investment in rural property. The variation in total return based on rural land use has the potential to provide the investor with significant portfolio diversification benefits by investing in a range of rural land use properties.

This study of the impact of farm management on rural land returns has only focused on the difference in the income returns of the average farmer compared to the best farmers in the various rural property types. These results have shown a very significant difference in total returns. In fact these differences could actually be greater as there has been no differentiation in the annual capital gain for rural properties owned by the average farmer and those owned by the better farmer. It would not be unreasonable to assume that a better managed property would also achieve a higher annual capital gain and be less volatile than an average rural property. If this hypothesis can be proved with further research, then the difference in total annual returns between the average and the best farmers would be even greater than this study has proven.

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