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The Profitability of Hail Netting in Apple Orchards

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Abstract

Approximately 40% of the apple orchard area on the Granite Belt in Queensland is covered with nets to protect the crop from hail damage. The effects of hail netting on apple orchard microclimate, productivity and tree growth have been measured over many seasons; however, limited work has been done on evaluating the economic benefits.

Cost-benefit analysis was used to calculate the expected profitability of hail netting on the Granite Belt. Criteria used were the Equivalent Annual Return (the annualised Net Present Value), the Internal Rate of Return and the Payback Period. Estimates of the net benefits have taken into consideration the secondary benefits of hail netting, such as reductions in sunburn and bird damage to apples, and were partly based on the probability distribution of hailstorms on the Granite Belt. Insufficient historical hailstorm data were available, so the probability distribution was developed from a survey of experienced growers in the region.

The incidence and severity of hailstorms can vary significantly between growers within the same district. Therefore, the cost-benefit analysis was developed in such a way that it can be used as a decision tool for individual growers. By entering information about his or her own orchard, a grower can determine if it is likely to be profitable to erect a hail net.

INTRODUCTION

The Granite Belt is the main region for commercial apple production in Queensland, and produced approximately 28 000 tonnes of apples, worth $29 million, in 1995/96 (ABS 1998). The Granite Belt district is prone to hailstorms and approximately 40% of the apple orchard area is covered with hail netting. This paper addresses the question of the profitability of hail netting.

The two main apple varieties grown on the Granite Belt are Red Delicious (nearly 50% of Queensland production) and Granny Smith (30%) (Sevil & Smith 1997), both of which are relatively low value varieties. The varietal mix, however, is rapidly changing. The balance of production includes the higher value varieties of Royal Gala, Fuji and Pink Lady, and these dominate new plantings. Jonathan, Abas, Mutsu, SummerDel, Adina and Goldina are also grown. Apples under hail netting are generally high value and/or new varieties.

Approximately 75% of the apples produced on the Granite Belt are destined for the Brisbane market (Middleton 1998). The next major market is Sydney, followed by Melbourne. Only two per cent of Queensland apples are currently exported.

The apple production season extends from bud burst in September to final harvests in April. This coincides with the season for large hailstorms, which occurs from October to April (Bureau of Meteorology 1998, pers. comm., 18 August). Limited hail data are available; however, it is known that hailstorms occur, on average, twice per annum in the Granite Belt region. Over the past 33 years, approximately 30% of these hailstorms consisted of large hailstones (1.5 cm or greater).

Within the Granite Belt however, the occurrence of hailstorms can vary dramatically between growers. Discussion with growers suggests some experience a hailstorm every year, while the frequency for other growers can be quite low. Hence the importance of doing individual analyses for each grower. Nevertheless, an attempt has been made here to present an 'average' analysis for the Granite Belt.

Problem Statement and Objectives

The effects of hail netting on apple orchard microclimate, productivity and tree growth have been measured over many seasons (Middleton & McWaters 1996). Limited work, however, has been done on evaluating the economic benefits of hail netting. Given the large apple orchard area already under hail netting, it is likely to be profitable. The question then is, 'How profitable is hail netting?'.

More specifically, the objectives of this study were to assess:

- the likely profitability of hail netting on the Granite Belt, Queensland;
- the minimum annual losses to hailstorms required to justify hail netting; and
- the sensitivity of profitability to changes in the cost of hail netting, yield, packout and price.

Scope and Limitations

The calculations were based on the following data:

- The timeframe for the analysis was set at 24 years, this being twice the life expectancy of the netting. The life expectancy of the structure was 40 years.
- The hail net was first established when the apple trees were two years old, this being the first possible year of apple production. Trees were replaced after their 15th year.
- Management practices under netting were adapted to maximise productivity.
- The analysis is for one hectare with a planting density of 1 000 trees per hectare.
- Other than the costs directly associated with hail netting, establishment costs do not vary between apple orchards without and with hail netting.
- Taxation and financing arrangements have not been included.
- The impacts of new technologies do not vary between orchards that have or do not have hail netting.
- No allowance was made for damage to the crop from a collapse in the hail netting.
- There were no price effects resulting from increased production.

METHODOLOGY

A cost-benefit analysis, with a discount rate of 8%, was used to calculate the expected profitability of hail netting on the Granite Belt. The profitability criteria calculated were Equivalent Annual Return (the annualised Net Present Value), Internal Rate of Return and Discounted Payback Period. Risk analysis was incorporated to account for the uncertainty of both price and hailstorms.

Benefits were calculated as the difference between the gross margins for apples under hail netting and apples without the protection of a hail net. The use of gross margins was most appropriate as many of the factors that vary between the presence or absence of hail netting are those covered in the gross margin (see Table 1). Costs associated with hail netting were establishment, maintenance and insurance costs. The calculation of the benefits and costs is described in more detail below.

Table 1. Sources of the Benefits and Costs of Hail Netting

BENEFITS	COSTS
♦ Yield increase ♦ Income increase (due to increased packout) ♦ Reduced irrigation costs ♦ Reduced hand thinning costs ♦ Reduced spraying costs (due to effect of reduced wind under net)	♦ Establishment cost of hail net ♦ Annual maintenance costs of hail net ♦ Annual insurance of hail net

There are several other aspects of hail netting that were not included in this analysis:

- The potential to supply a consistent quantity and quality of apples, and hence maintain relationship with buyers (a grower benefit);

- ‘Peace of mind’ (a grower benefit); and
- The availability of fresh (versus cold storage) apples despite hailstorm activity (a consumer benefit).

Five specific varieties were analysed – Red Delicious, Granny Smith, Fuji, Pink Lady and Royal Gala – as well as a weighted average (“All Varieties”) of these varieties. The weights were based on the volume of production on the Granite Belt of each variety.

Benefits

The benefits of hail netting were calculated as the difference between the gross margin for apples under hail netting and the gross margin for apples not under hail netting. Calculation of the gross margins required yield, packout, price and cost of production information.

Queensland Department of Primary Industries officers provided estimates of yield and packout data based on the preliminary results of project AP614 ‘Maximising apple orchard productivity under hail netting’ (due for completion June 1999). These results indicate that yield would increase five per cent under netting with the use of management practices designed to maximise yields and improve fruit size. Although annual yields for different varieties may vary, an estimated average yield was applied to all varieties (see Table 2).

Table 2. Average Annual Yield, by Age of Tree

Age of Tree (years)	Yield (cases[a]/hectare)	
	Without Hail Net	With Hail Net
1	0	0
2	100	105
3	500	525
4	1 250	1 313
5 +	2 000	2 100

a. Standard 19 kg Australian apple and pear case.

Two grades of apples were used in this analysis – 1st grade and Processing. Packout, which is defined as the percentage of apples that are 1st grade, increases under hail netting irrespective of the hail effects. That is, in a year with no hailstorms, packouts are higher under hail netting due to the secondary benefits of reduced sunburn, windrub and bird damage. Table 3 lists the estimates of packout used in the analysis:

Table 3. Packout, by Variety

Variety	Packout (%)	
	Without Hail Net	With Hail Net
All Varieties[a]	77	93
Red Delicious	85	95
Granny Smith	70	95
Fuji	65	80
Pink Lady	60	75
Royal Gala	70	85

a. Weighted average.

The packouts under hail netting for both Red Delicious and Granny Smith apples were relatively high compared to those of the other varieties. Pink Lady apples had the lowest packout, with or without a hail net.

The prices used in this analysis were based on the average of the 1996 and 1997 Brisbane market prices. Prices can vary significantly between different apple varieties, as shown in Table 4. The average prices ranged from a low of $16.50 per case (Red Delicious) to a high of $34.00 per case (Royal Gala).

Table 4. 1996/97 Apple Prices, by Variety

Variety	**Price ($/case)**		
	Low	**Average**	**High**
All Varieties[a]	10.43	19.88	30.37
Red Delicious	9.00	16.50	24.00
Granny Smith	9.50	19.50	36.50
Fuji	12.50	24.00	36.00
Pink lady	20.00	24.50	27.00
Royal Gala	11.50	34.00	43.00

a. Weighted average.
Source: Market Information Services (1997; 1998)

The low, average and high prices for processing apples were estimated at $120 per tonne, $150 per tonne and $200 per tonne, respectively. The price for processing apples was likely to be consistent between all apple varieties.

The uncertainty in prices was accounted for by using the low, average and high prices to calculate an expected price based on a BetaPERT distribution (Vose 1996). The expected values were calculated as follows:

$$\text{Expected Value} = \frac{\text{low value} + 4 \times \text{average value} + \text{high value}}{6}$$

Variable costs of production were based on a feasibility study by Sevil and Smith (1997). The variable costs related to fertiliser, weed, insect and disease control, irrigation, training & pruning, fuel, oil, repairs & maintenance (FORM) of machinery, tended to be lower under hail netting for a number of reasons including:

- reduced irrigation requirements;
- fewer spraying operations; and
- reduced hand thinning.

Other variable costs, however, were higher under netting due to the increased yield and packout. First grade apples cost more to pick, pack, freight and market than processing apples. The overall effect was higher variable costs of production per hectare under hail netting (see Table 5).

Despite being lower value varieties, both Red Delicious and Granny Smith apples had relatively high variable costs of production due to the high packout.

Table 5. Variable Costs of Production, by Variety.

Variety	Total Variable Costs ($/hectare)[a]	
	Without Hail Net	**With Hail Net**
All Varieties	20,298	23,857
Red Delicious	20,829	23,267
Granny Smith	19,247	24,369
Fuji	18,995	22,482
Pink Lady	18,122	21,569
Royal Gala	21,303	25,225

a. These costs were based on the packouts in Table 3.

Salvage Values

Salvage values were included at the end of the life expectancy for netting and also at the end of the analysis for both the netting and the structure. The salvage value at the end of the useful life was 10% of the initial cost of the net and structure.

Costs

The total establishment cost of the hail net was $25,000 per hectare (based on Sevil & Smith 1997). Fifty percent of the cost was attributed to the net, twenty percent to the structure and the balance for labour. Annual maintenance costs were estimated to be $400 per hectare, including retensioning of the net. The annual insurance cost for the net and structure was estimated at two per cent of the new cost of the hail netting.

Risk Analysis – Hailstorm Events

Hailstorm incidence and severity have not been adequately documented for the Granite Belt. Hence, a sample of growers was surveyed to estimate these for the region. This sample was selected based on the length of time the grower had been in the region and their location, the aim being a sample dispersed across the Granite Belt. Each grower was asked to place probabilities against the occurrence of 11 different hail events.

Hail events were described by the cumulative damage to the 1st grade apples in a season. For example, two hailstorms in one season that damaged a total of 75% of the 1st grade apples were defined as a single hail event with 75% damage. The eleven hail events were: no hailstorm/no damage; 1–10% damage; 11–20% damage; and so on. Within each event, it was assumed that the probability of damage was evenly distributed across the possible range. For example, within the range of 1–10 percent damage, one per cent damage was as likely as two per cent damage, and so on.

Hail events were simulated by generating a random number each year and then converting this to a percentage annual loss of 1st grade apples based on the probability distribution of hail events. In each year, the packout was adjusted to incorporate this loss, and a ‘without’ gross margin calculated. The simulation consisted of 1 000 runs to generate a probability distribution for the equivalent annual return.

RESULTS

Two analyses were conducted for each apple variety. The first was a deterministic analysis to assess the minimum hail losses required to justify hail netting. The profitability of hail netting was calculated using the full range of possible hail events, from no losses attributed to hail to 100% loss of 1st grade fruit from hailstorms. A simulation based on the probability distribution function for hail events on the Granite Belt was also conducted for each variety.

Deterministic Analysis

The results of the deterministic analyses are presented in Figure 1.

For the average orchard ("All Varieties"), hail netting was profitable as long as the minimum annual loss to hail was at least nine per cent of 1st grade apples. In the absence of any damaging hailstorms (annual loss equals zero), the equivalent annual return (EAR) was -$830 per hectare. The profitability of hail netting increased with increasing annual loss of 1st grade apples from hailstorms. With 100% losses annually, the EAR was $9,363 per hectare, with an internal rate of return (IRR) of 35% and payback period of just five years.

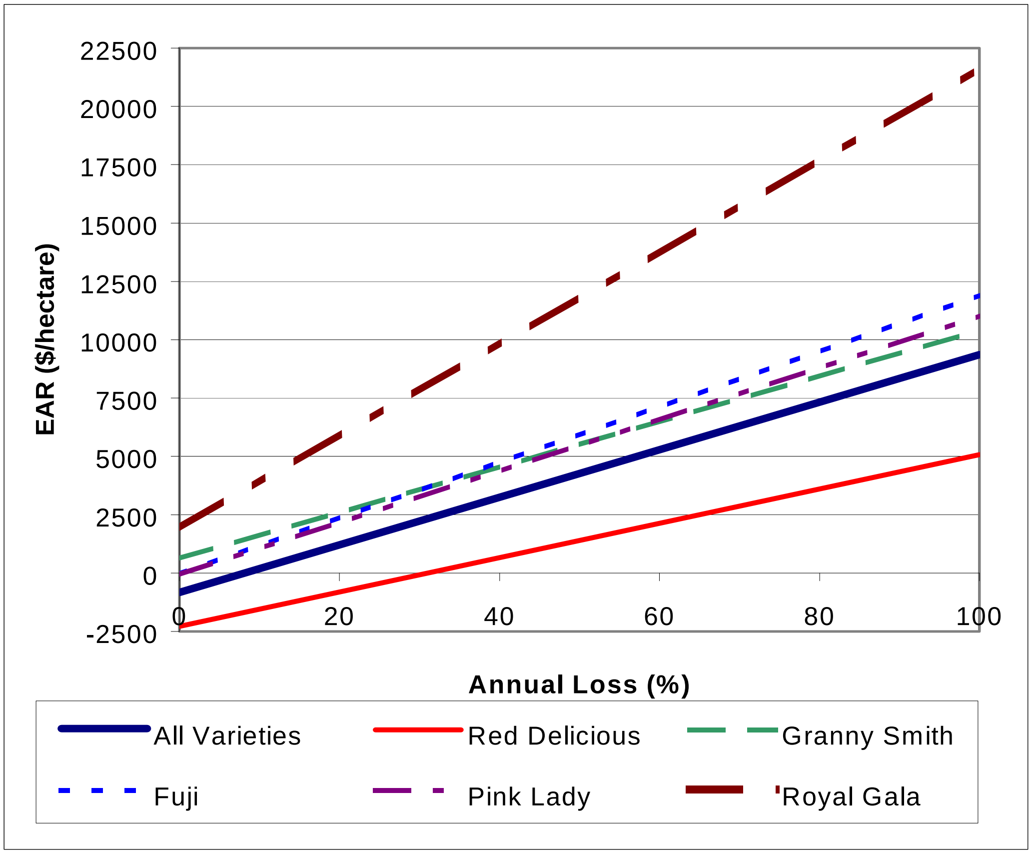


Figure 1. Profitability of Hail Netting (Deterministic), by Variety

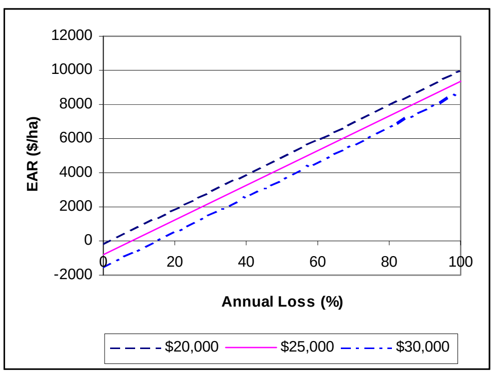
For hail netting of Red Delicious apples to profitable, the annual loss to hailstorms would need to exceed 32% of 1st grade apples. With no annual losses to hail, the EAR was -$2,286 per hectare. This increased to $5,047 per hectare under annual losses of 100% of 1st grade apples.

The minimum annual losses to hail required to maintain profitability of hail netting was just one per cent for both Fuji and Pink Lady apples. The EAR of Fuji and Pink Lady is similar when there are no annual losses to hailstorms, but hail netting of Fuji apples becomes relatively more profitable as annual loss increases. Given that these apple varieties have similar expected price, the results reflect the higher packout of Fuji apples.

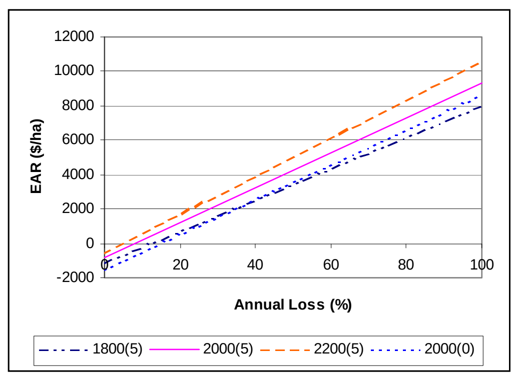
Hail netting of Granny Smith and Royal Gala apples was profitable even in the absence of hailstorms. With no losses to hail, the EAR of Granny Smith and Royal Gala apples was $610 per hectare and $1886 per hectare, respectively. For both these varieties, the secondary benefits of hail netting alone outweighed the costs.

Factors Affecting Profitability

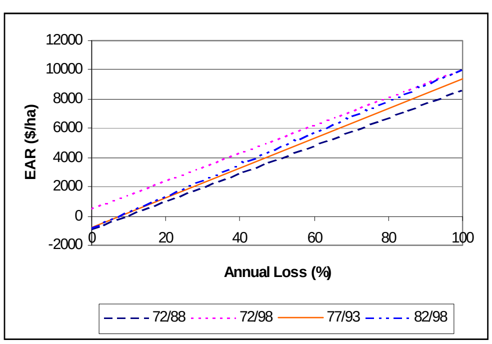
The results in this section were based on deterministic analyses using "All Varieties" and are presented in Figure 2. In each case, the solid line represents the base analysis for "All Varieties".



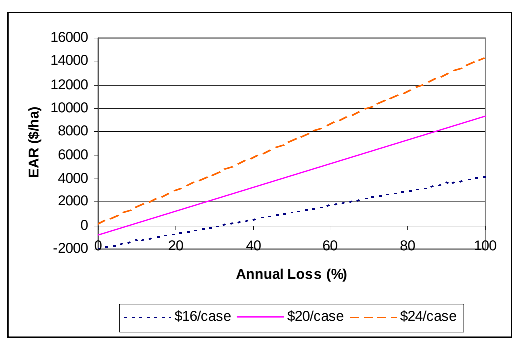
(a) Hail Netting Cost



(b) Effect of Yield



(c) Packout



(d) Price

Figure 2. Effect of Cost, Yield, Price and Packout on Profitability of Hail Netting

Decreasing the cost of hail netting to $20,000 per hectare increased the EAR by $658 per hectare (see Figure 2(a)). For hail netting to be profitable in this scenario required minimum losses of just two per cent of 1st grade apples per annum. At a high cost of hail netting ($30,000 per hectare), the minimum annual loss required increased to 15% of 1st grade apples. In this case, the EAR decreased by $658 per hectare.

The profitability of hail netting increased with increasing yield (see Figure 2(b)). Under average price and yield, the EAR was -$844 per hectare in the absence of hail netting. For hail netting to be profitable, the minimum annual losses need to be at least nine per cent of 1st grade apples. Decreasing the yield to 1 800 cases per hectare, but maintaining the five per cent increase under netting, increases the minimum annual loss required for profitability to 13% of 1st grade apples.

The effect of not obtaining an increase in yield under netting (2 000 cases with no increase under netting) was more severe on hail netting profitability than a low yield (1 800 cases with an increase under netting). In this case, the EAR decreased by $600 per hectare at each level of annual loss and a minimum annual loss of 16% of 1st grade apples was required for profitability.

The profitability of hail netting increases with increasing packout. This effect is most noticeable with higher annual losses to hailstorms (see Figure 2(c)). With no losses to hail, only $100 separates the EARs of the three scenarios where the difference in packouts is constant at 16% - 72/88, 77/93, and 82/98. When annual losses to hail reach 100% however, the difference increases to over $1,500 per hectare.

A large increase in the packout under netting relative to the packout achieved without netting had a greater influence on profitability. For example, when the packout was 72% without netting and 98% with netting (72/98 on Figure 2(c)), the EAR was positive even in the absence of any damage from hailstorms.

With a low price of $16 per case, annual losses to hail of 31% or more of 1st grade apples were required for hail netting to be profitable. With a high price, however, no losses to hail were required. Relative to the other factors tested, price was most influential in profitability. This is reflected in the increasing profitability as annual losses to hail increase. With no losses to hail, the EAR ranged from -$1,908 per hectare ($16 per case) to $220 per hectare ($24 per case) – a difference of just over $2,100. The difference increased to over $10,000 when annual loss to hail was 100% of 1st grade apples.

Hail Simulations

The probabilities provided by individual growers were used to produce a probability distribution of hail events for the Granite Belt region. This is shown in Figure 3.

For any particular year, the probability of either no hailstorm or no damaging hailstorms was just under 50%. This was a little higher than expected given that, on average, two hailstorms per year occur on the Granite Belt. The next most likely hail event was one which damaged 1–10% of the 1st grade apples, followed by an event that damaged 91–100% of the 1st grade apples. The expected annual loss was 19% of 1st grade apples.

Figure 3. Hail Event Probability Distribution

Using simulations based on the above probability distribution for hail events, hail netting was profitable for all apple varieties, with the exception of Red Delicious apples (see Table 6 and Figure 4).

For "All Varieties", which represents the average apple orchard on the Granite Belt, the expected EAR of hail netting was estimated at $1,030 per hectare, with an IRR of 12% and a discounted payback period of 11 years. There was a small chance (<6%) of a negative EAR and a 50% chance of achieving an EAR of $997 per hectare.

Table 6. Expected Profitability of Hail Netting, by Variety

Variety	**Expected Price** ($/case)	**Packout** (% without / % with)	**Expected Equivalent Annual Return** ($/ha)	**Expected IRR** (%)	**Expected Payback Period** (years)
All Varieties	20.05	77/93	1,030	12	11
Red Delicious	16.50	85/95	-958	3	na
Granny Smith	20.67	70/95	2,379	18	7
Fuji	24.08	65/80	2,090	15	8
Pink Lady	24.16	60/75	1,932	16	9
Royal Gala	33.08	70/85	5,406	23	7

With an expected EAR of -$958 per hectare, hail netting of Red Delicious apples was not profitable. Given the relatively high packout under hail netting, this result reflects the low price of Red Delicious apples. The EAR ranged from -$2,226 per hectare to $835 per hectare, but there was a less than five per cent chance of a positive EAR.

With high packout and average price, the expected EAR of hail netting of Granny Smith apples was $2,379 per hectare, with an IRR of 18% and discounted payback period of just seven years. The results for Granny Smith apples reflect the large increase in packout under hail netting. The EAR ranged between $880 and $5,017 per hectare.

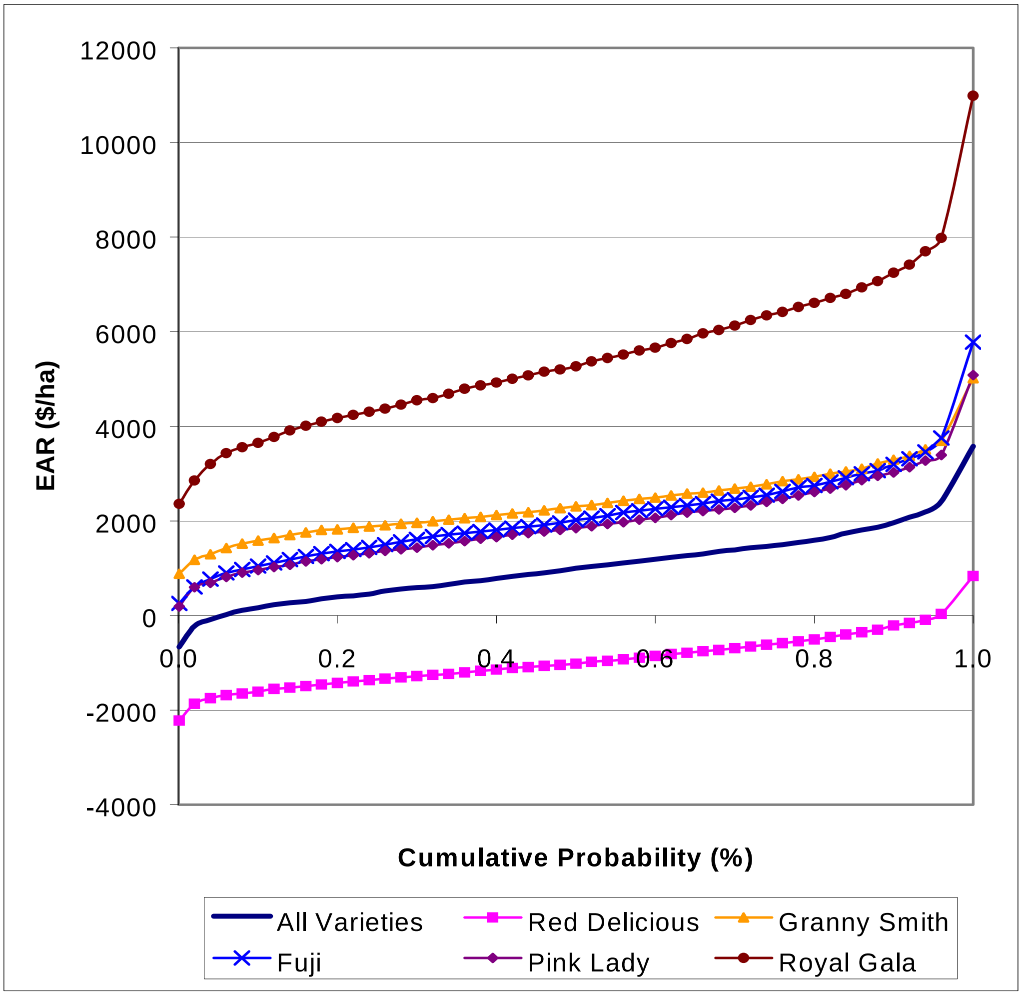


Figure 3. Profitability of Hail Netting (Simulation), by Variety

Although the price of Fuji apples was almost $4 per case higher than Granny Smith apples, the expected EAR was almost $300 per hectare lower due to the low packout. The expected EAR was $2,090 per hectare, with an IRR of 15% and a discounted payback period of eight years. EAR ranged between $255 and $5,782 per hectare – a much wider range than Granny Smith apples.

Pink Lady apples had an expected price equivalent to Fuji apples but a lower packout. This resulted in a lower expected EAR of hail netting. The expected EAR was $1,932 per hectare, with an IRR of 16% and a discounted payback period of nine years. EAR ranged between $189 and $5,082 per hectare.

Royal Gala apples were the most profitable apple variety to hail net, with an expected EAR of $5,406 per hectare. The IRR was 23% and the discounted payback period just seven years. These results reflect the very high price of Royal Gala apples. In the simulation, the lowest EAR was $2,361 per hectare, which was higher than the expected EAR of most of the other varieties.

For Granny Smith, Fuji, pink Lady and Royal Gala there was no chance of a negative EAR.

CONCLUSIONS

Given the probability distribution of hail events estimated in this paper, hail netting on the Granite Belt was profitable for most of the apple varieties analysed. This was especially so for the higher value varieties (Fuji, Pink Lady and Royal Gala) and where packout under hail netting was high relative to the packout with no hail netting (Granny Smith). For these four varieties hail netting was profitable even with minimal or no losses from hailstorms.

The only apple variety for which hail netting was not profitable was Red Delicious. Based on the data used, it was estimated that annual losses to hailstorms would need to exceed 32% of 1st grade apples to achieve consistent positive returns from hail netting. This is considerably higher than the expected annual loss from hailstorms for the Granite Belt, which was estimated at 19% of 1st grade apples per annum.

The analyses showed that the profitability of hail netting increases with decreasing cost of hail netting, and increasing yield, packout and price. Of these, price was the most influential factor.

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APPENDIX – DECISION TOOL

Given the variability in hailstorm incidence and severity, not just within the Granite Belt region, but for most apple growing regions of Australia, as well as the variability in management practices, prices and yields, an 'average' analysis is not always useful to the individual grower. Hence, the spreadsheet this analysis uses was set up to allow a high level of flexibility.

The following page is the main input screen. Data that can be changed include:

- life expectancy of the net and structure, with restrictions on the minimum years;
- total cost of hail netting and the breakdown of this cost;
- salvage values of net and structure;
- annual maintenance cost of hail netting, including an allowance for annual rolling and unrolling (which is not practiced on the Granite Belt);
- annual insurance cost for netting;
- apple variety and life expectancy of tree;
- yield by year and yield increase under netting;
- price by grade of apple – the program allows for up to four grades;
- packout percentage for each grade of apple;
- orchard operation costs and other production costs – with an option of using a gross margin template to calculate these costs;
- probabilities for each possible hail event, with the option of doing a deterministic analysis; and
- discount rate.

APPLE HAIL NET BENEFIT COST ANALYSIS - Main Page

Notes: Enter data only in yellow cells. Green cells contain formulas.

Details of the netting:

Life Expectancy:

Netting	12	years	(minimum of 8 years)
Structure	40	years	(minimum of 25 years)

Total Cost: 25000 $/ha

Cost Breakdown:	% of Total Cost		Calculated Cost	
Netting material	50.0	%	12500	$/ha
Structure Material	20.0	%	5000	$/ha
Netting Labour	4.5	%	1125	$/ha
Structure Labour	25.5	%	6375	$/ha
Must Sum to 100	**100.0**		25000	

Salvage Values at end of life expectancy:

Netting material	1250	$/ha
Structure Material	500	$/ha

Annual Costs:

Structure Maintenance	200	$/ha per annum
Net Maintenance		$/ha per annum
Retensioning	200	$/ha per annum
Roll/Unroll		$/ha per annum

	% of Total Cost		Calculated Cost	
Annual Insurance:	2.0	%	500	$/ha per annum

Details of the apple trees:

Apple Variety: All Varieties

Age of trees when net first established: 2 years

Life of tree (total years in ground): 15 years

Yield (no hail net & no hail):

Year	Low	Average	High	
1	0	0	0	cases/ha
2	100	100	100	cases/ha
3	500	500	500	cases/ha
4	1250	1250	1250	cases/ha
5	2000	2000	2000	cases/ha

Prices:	Low	Average	High	
Export	20.00	20.00	20.00	$/case
1st Grade	10.43	19.88	30.37	$/case
2nd Grade	20.00	20.00	20.00	$/case
Processing	90.00	150.00	200.00	$/tonne

Yield Increase Under Netting (optional): 5 %

Volume of Standard Case: 19 kg

Packout:	without hail net	with hail net	
Export	0	0	%
1st Grade	77	93	%
2nd Grade	0	0	%
Process	23	7	%
	100	**100**	

The differences in packouts should only reflect the secondary effects of the hail net (eg reduced sunburn). Do not include any consideration for packout lost due to hail storms.
Packout must sum to 100

Orchard Operation Costs:

Without Hail Net	4202	$/ha
With Hail Net	4160	$/ha

Other Production Costs:

Graded Fruit	9.96	$/case
Processing Fruit	86.28	$/tonne

Details of hailstorms:

Probabilities:			Cumulative
No Hail Storm/No Damage	49.0	%	49
Hail Storm: 1 - 10% Damage	13.7	%	63
Hail Storm: 11 - 20% Damage	9.8	%	73
Hail Storm: 21 - 30% Damage	7.0	%	80
Hail Storm: 31 - 40% Damage	1.7	%	81
Hail Storm: 41 - 50% Damage	4.6	%	86
Hail Storm: 51 - 60% Damage	2.8	%	89
Hail Storm: 61 - 70% Damage	0.8	%	90
Hail Storm: 71 - 80% Damage	0.8	%	90
Hail Storm: 81 - 90% Damage	0.0	%	90
Hail Storm: 91 - 100% Damage	9.6	%	100
	100	%	
	Must sum to 100		

OR: ***Average Annual Loss of Graded Fruit:***

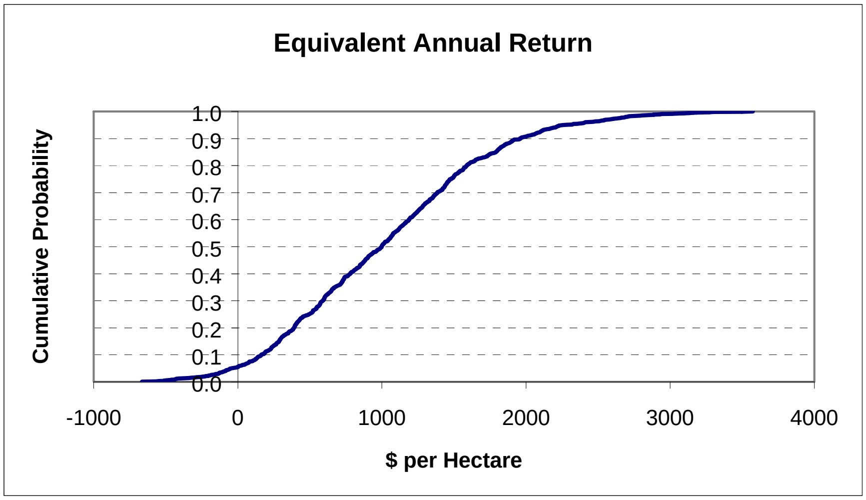
Loss: %

Discount Rate:

Discount Rate: 8 %

Summary

Apple Variety:	All Varieties
Net Establishment Cost:	25000 $/ha
Expected Steady State Yield:	2100 cases/ha (under net)
Expected Annual Loss:	18.8 % of graded fruit
Expected	
Equivalent Annual Retur	1030 $/ha (Exp NPV= 10843 $/ha)
IRR:	12.3 %
Payback Period:	11 years



Assumptions

	Expected Prices:	Packout (%): without hail net	Packout (%): with hail net
Export	20.00 $/case	0	0
1st Grade	20.05 $/case	77	93
2nd Grade	20.00 $/case	0	0
Processing	148.33 $/tonne	23	7

Item	**Life Expectancy**
Netting	12
Structure	40

Year	**Yield (no hail net & no hail)**		
	Low	Average	High
1	0	0	0
2	100	100	100
3	500	500	500
4	1250	1250	1250
5	2000	2000	2000

Cost	**without net $/ha**	**with net $/ha**
Orchard Operating Costs	4202	4160
	Graded Fruit $/case	**Processing Fruit $/tonne**
Other Production Costs	9.96	86.28