Assessing Your Orchard Renewal Strategies?

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Capital Investment Analysis

Profitability

Can I make money doing this?

- Net Present Value
- Internal Rates of Return
- Payback Period

PENNSYLVANIA 2012–2013

TREE FRUIT PRODUCTION GUIDE

TREE FRUIT PRODUCTION BUDGETS

This section presents sample tree fruit budgets based on projected costs, technology, and management for the 2012 crop year.* Enterprise budgets represent estimates of the costs and returns associated with the production of specified agricultural products. The information contained in enterprise budgets can be used by agricultural producers, extension specialists, researchers, financial institutions, governmental agencies, and others for making decisions in the food and fiber industry. Budgets are used:

- for farm planning and enterprise evaluation
- as a basis for extending credit
- to complete cash flow projections
- to provide basic data for economic research
- to inform nonfarmers of the costs incurred in producing food and fiber crops†

The sample budgets were developed using a computerized budget generator. Input data reflect current production practices and prices. Major subheadings in the budgets are receipts, variable costs, fixed costs, and total specified costs. They are defined as follows:

- Receipts are the gross returns (price times quantity) from production. For tree fruit, receipts may be zero for several years. Because yields, grades, and prices are so variable, you should use representative values for your operation.
- Variable costs are costs that vary depending on the level of production for such inputs as fertilizer, herbicides, insecticides, fungicides, and labor.
- Fixed costs are costs that do not vary by level of production and are incurred by virtue of owning assets such as machinery and land. Depreciation, insurance, and taxes are examples of fixed costs.

Table 9-3. Fresh-market apple production budgets, 908 trees per acre, with and without mating disruption, Pennsylvania, 2012. Summary of estimated costs per acre.

			Without mating disruption		With mating disruption		
Item	**Unit**	**Price ($)**	**Quantity**	**Amount ($)**	**Quantity**	**Amount ($)**	**Your estimate***
RECEIPTS	bushel						
VARIABLE COSTS							
Lime	ton	26.70	0.50	13.35	0.50	13.35	
Fertilizer							
N	pound	0.25	20.00	5.00	20.00	5.00	
P	pound	0.38	30.00	11.40	30.00	11.40	
K	pound	0.32	30.00	9.60	30.00	9.60	
Urea (spray additive)	pound	0.25	2.50	0.63	2.50	0.63	
Solubor	pound	1.88	6.00	11.28	6.00	11.28	
Calcium chloride	pound	0.44	50.00	22.00	50.00	22.00	
Herbicides							
2,4-D amine	gallon	14.82	0.23	3.47	0.23	3.47	
Gramoxone Inteon	gallon	32.83	0.08	2.56	0.08	2.56	
Princep 90DF	pound	5.70	0.75	4.28	0.75	4.28	
Solicam 80DF	pound	27.01	0.75	20.26	0.75	20.26	
Fungicides							
Captan 80W	pound	6.99	23.00	160.77	23.00	160.77	
Flint 50WG	ounce	10.79	2.50	26.98	2.50	26.98	
Inspire Super	ounce	1.70	20.00	34.00	20.00	34.00	
Kocide 3000	pound	10.00	7.00	70.00	7.00	70.00	
Penncozeb DF	pound	3.62	15.00	54.30	15.00	54.30	
Streptomycin	pound	11.76	9.00	105.84	9.00	105.84	
Sulfur 90W	pound	0.68	12.00	8.16	12.00	8.16	
Topguard	pound	6.88	26.00	178.88	26.00	178.88	
Pristine 38WG	ounce	3.11	37.00	115.07	37.00	115.07	
Insecticides/Mating Disruption**							
Actara	ounce	3.15			5.00	15.75	

AgTools™

AgProfit™

Can I make money doing this & can I afford it based on this scenario?

AgLease™

Establishing equitable crop share & cash rent leases

***AgTools*™ are a suite of Windows based computer programs to help agricultural producers make short, medium, and long-run investment decisions.**

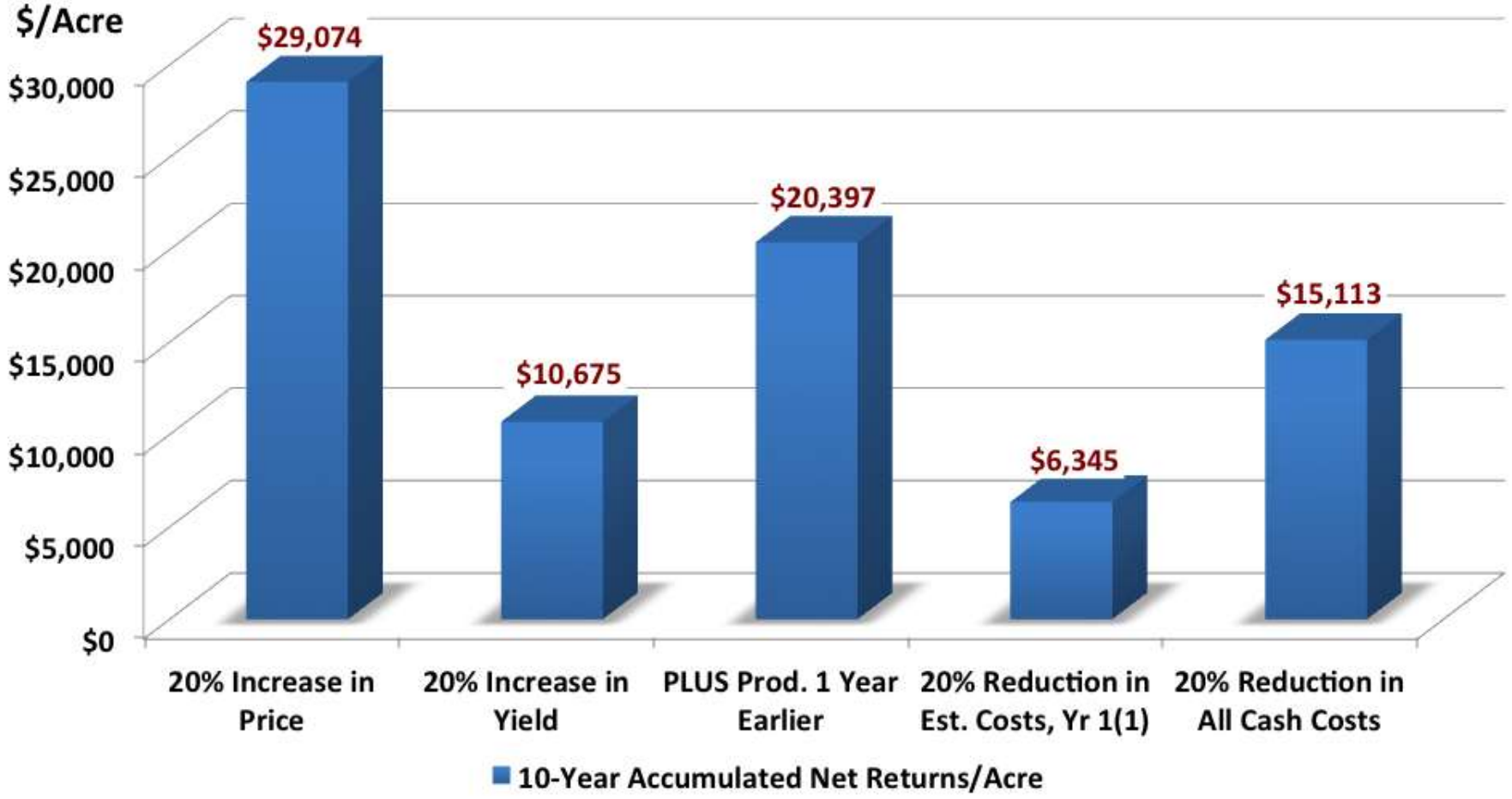
Crop/Livestock Budgets & Grower Information

All you need is a little preparation a lot of bricks & mortar

3 key Factors to Successful Orchard Renewal:

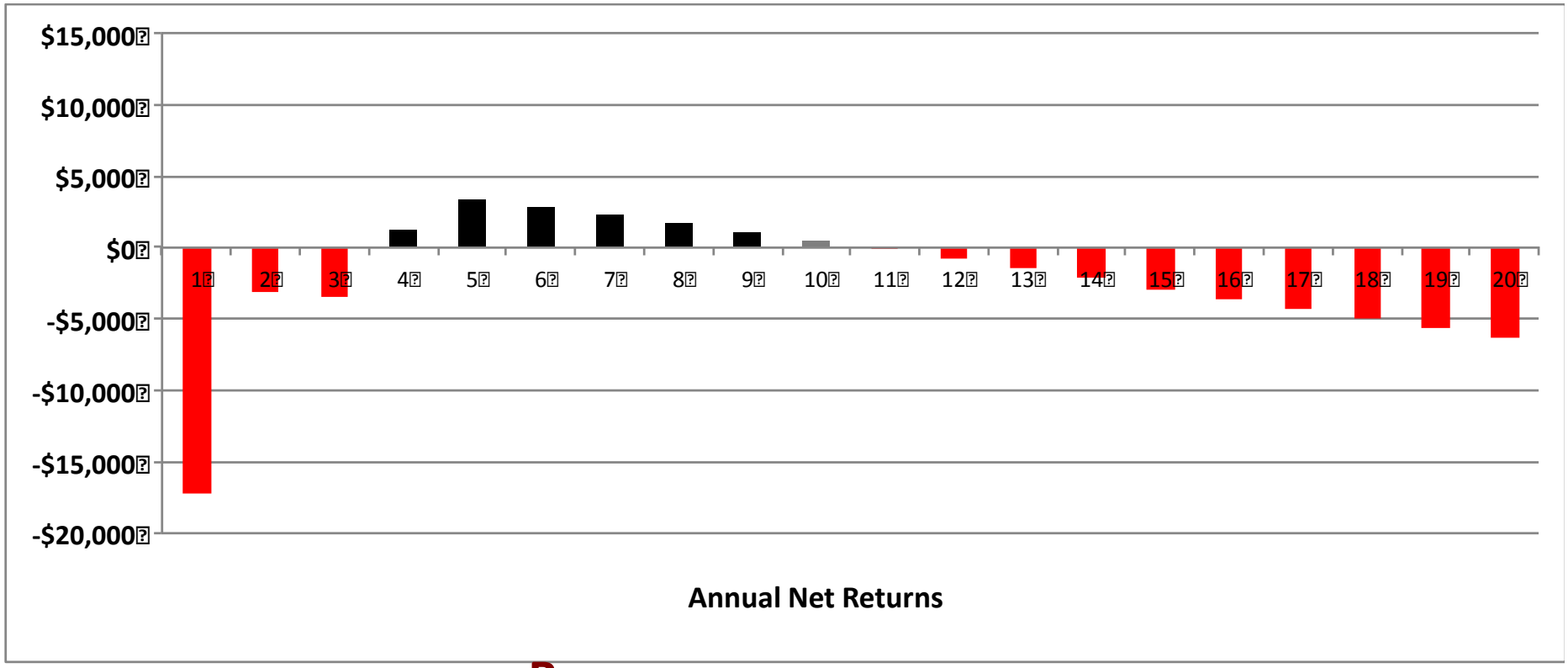
1. Price
2. Yield (When & How Much)
3. Establishment Costs

Comparing Factors of Successful Orchard Renewal when Establishing a H-D Gala Block Based on Assumptions in Study



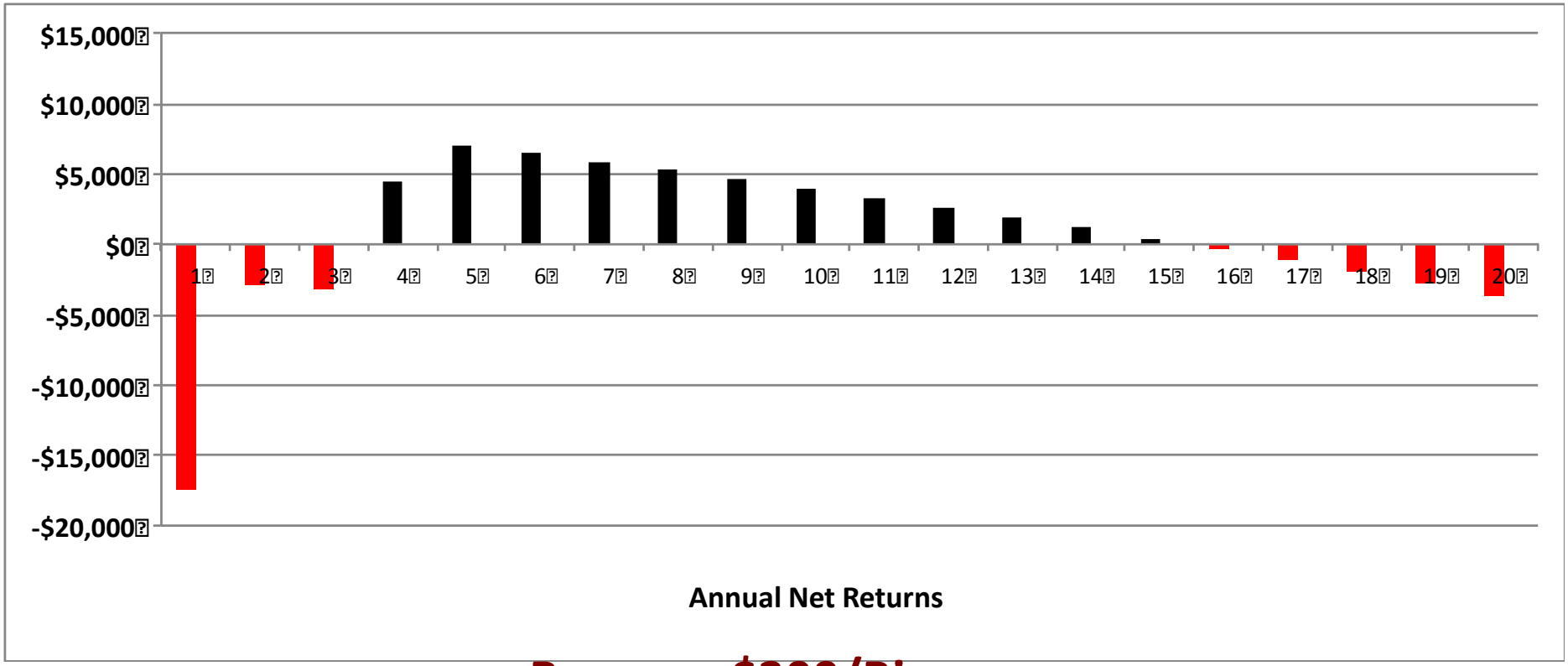
(1) Eliminate Fumigation ($750); 20% less trees (1,089 to 871); 20% reduction in cost of trellis system ($2,050 to $1,640); 20% reduction in cost of irrigation system ($2,165 to $1,732); and pruning & training costs reduced by 20% in years 1 through 10 (less trees)

Establishing High Density Gala Block
Based on Assumptions in Study



	Base
Total Net Returns	($41,300)
Net Present Value	($21,034)
ROI	N/A

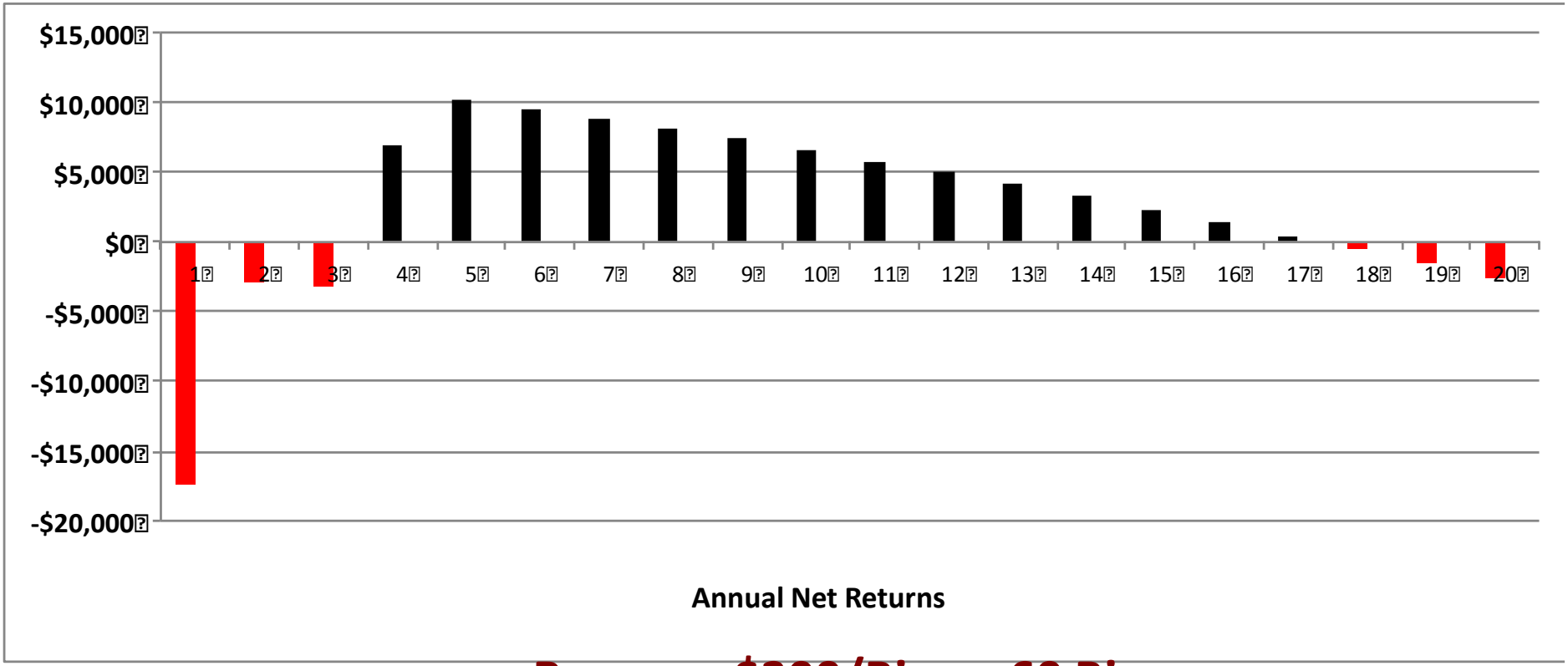
Establishing High Density Gala Block
With a 20% Increase in Price from $250 to $300/Bin



	Base	$300/Bin
Total Net Returns	($41,300)	$ 9,619
Net Present Value	($21,034)	$ 164
ROI	N/A	8.17%

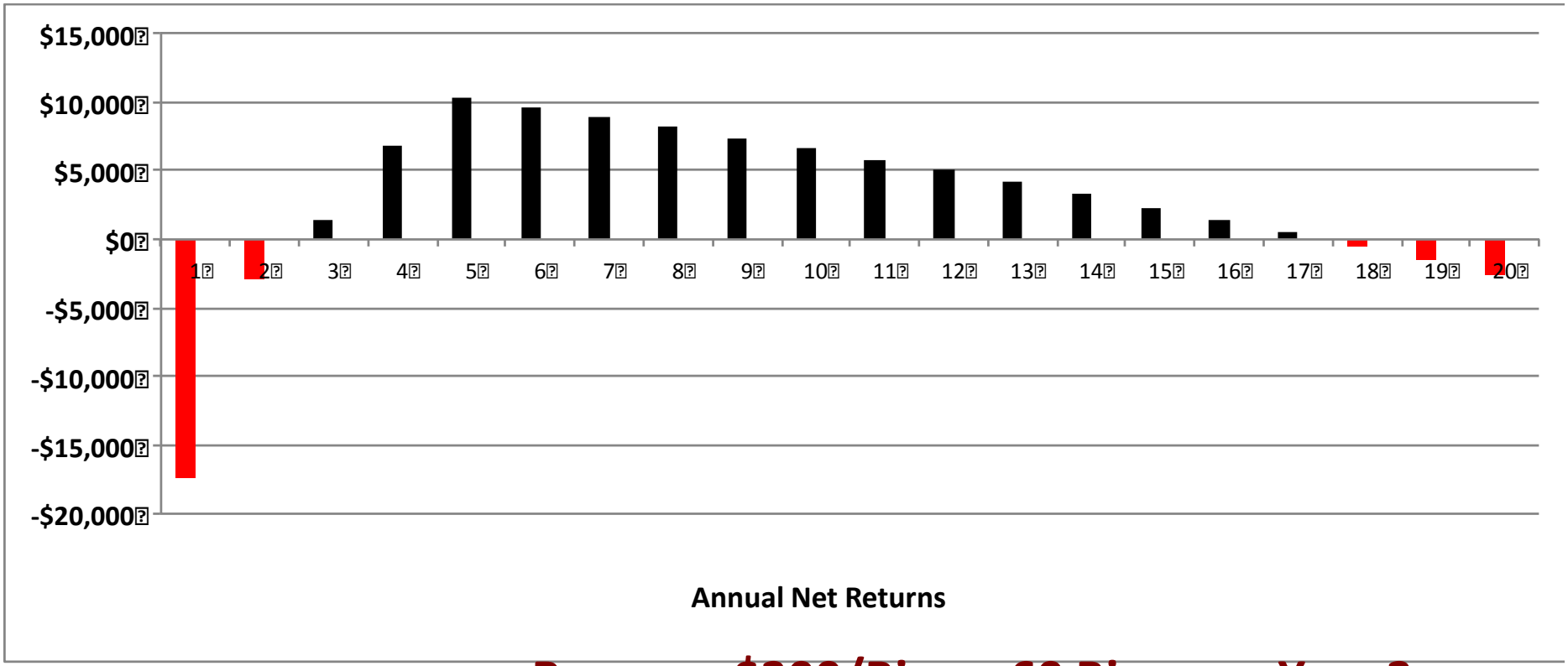
Establishing High Density Gala Block

PLUS Increasing Yields 20% from 50 to 60 Bins/Ac



	Base	$300/Bin	60 Bins
Total Net Returns	($41,300)	$ 9,619	$36,654
Net Present Value	($21,034)	$ 164	$12,605
ROI	N/A	8.17%	17.03%

Establishing High Density Gala Block
PLUS Producing 35 Bins/Acre in Year 3



	Base	$300/Bin	60 Bins	Year 3
Total Net Returns	($41,300)	$ 9,619	$36,654	$43,944
Net Present Value	($21,034)	$ 164	$12,605	$18,481
ROI	N/A	8.17%	17.03%	22.41%

Capital Investment Analysis

Profitability

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- Internal Rates of Return
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Can I afford to do it with the current resources available?

Feasibility

Whole Farm Analysis

- Cash Flow
- Net Income
- Net Worth

AgTools™

AgFinance™

Based on a whole-farm financial analysis, do I have the resources to implement this decision?

AgProfit™

Can I make money doing this & can I afford it based on this scenario?

AgLease™

Establishing equitable crop share & cash rent leases

Crop/Livestock Budgets & Grower Information

***AgTools*™ are a suite of Windows based computer programs to help agricultural producers make short, medium, and long-run investment decisions.**

All you need is a little preparation a lot of bricks & mortar

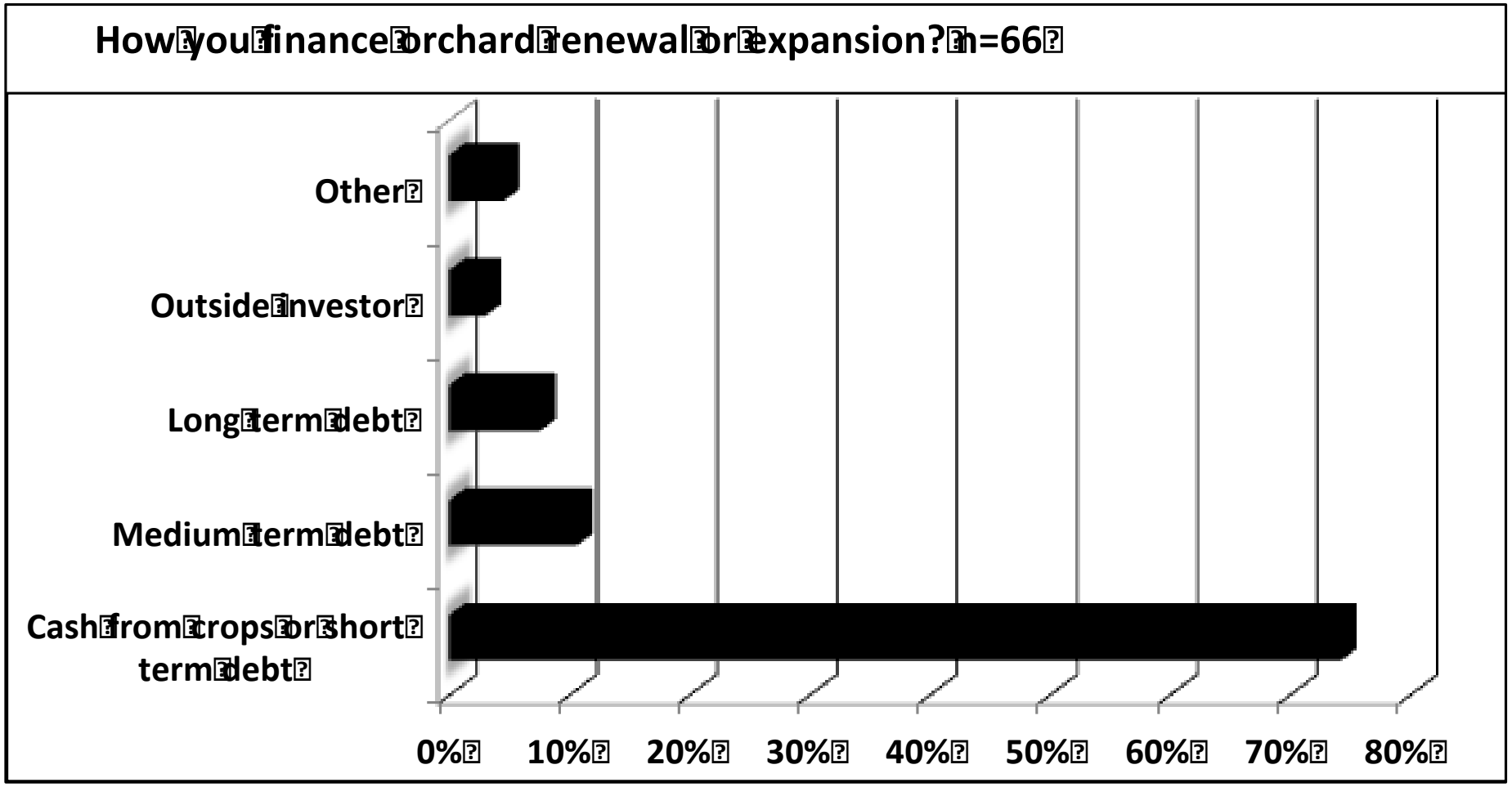
Examples of what *AgFinance™* can do for you!

- Incorporates *AgProfit™* & *AgLease™* files to:
  - Determine the number of acres you can remove and replant to another cropping system without jeopardizing liquidity, solvency & profitability
  - Determine whether the capital investments in technology can be paid from annual cash flows or require a capital loan
  - Show the annual cash flows of individual blocks/crops/fields or livestock enterprises and their contributions to the business
  - Provide 10-years of pro-forma net income statements and balance sheets.

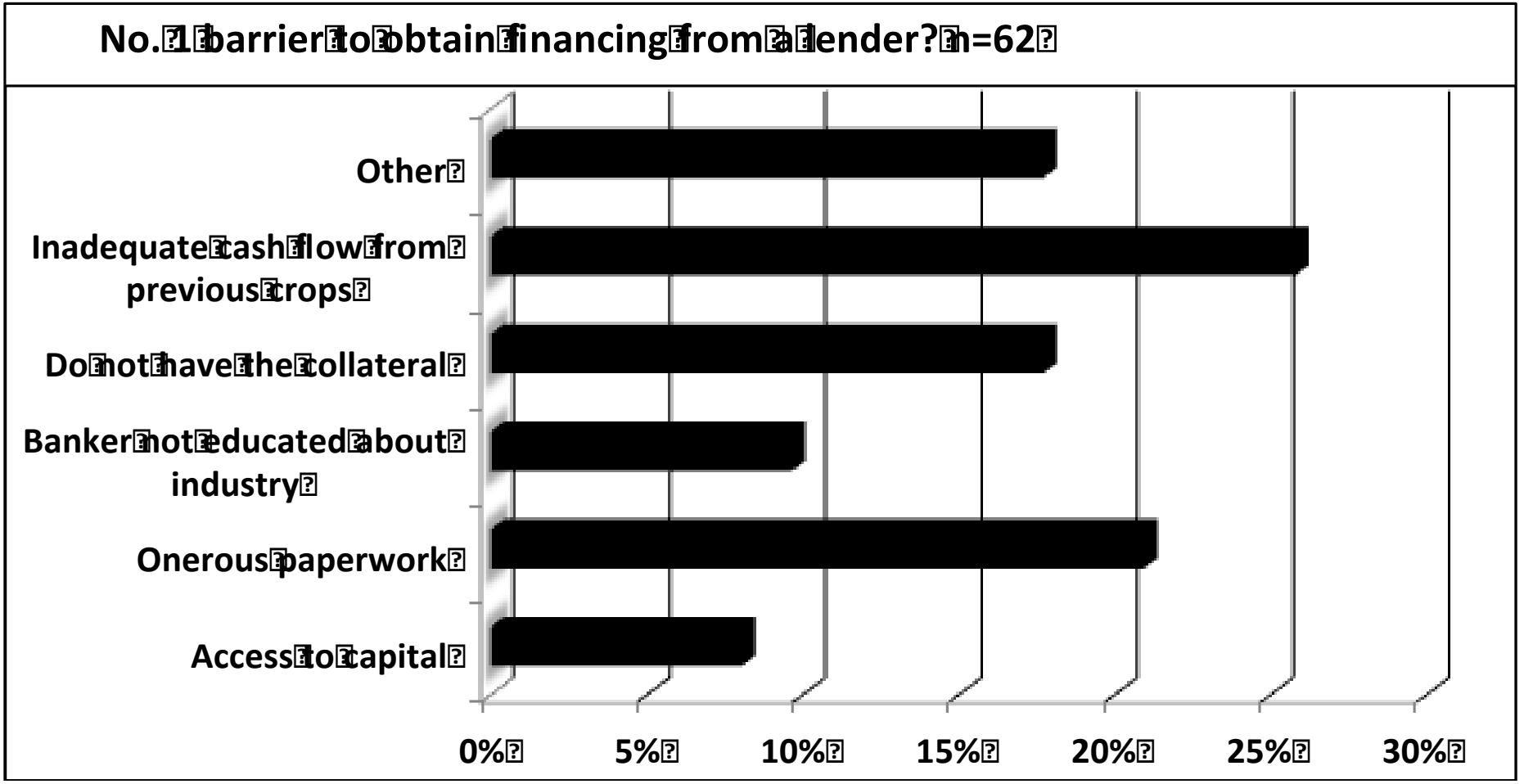
What makes *AgTools™* so different from other cost studies or previous computer programs?

- Takes into account the time value of money
- The ability to inflate returns and costs over time
- Generate machine operation costs
- Determines profitability & feasibility
- Determines equitable crop-share and cash rent leases for up to 40-years
- Provides a whole farm analysis with accrual adjustments for inventories & generates 18 financial ratios and performance measures

AgTools™ Academy Results



AgTools™ Academy Results



The Williams Tree Fruit Farm

Block	Variety	Acres	Years of Age	System	Trees/Acre
A	Gala	15	Mature >20	Free Standing	350
B	Gala	20	Mature 10	Single-wire trellis	550
C	Gala	10	Mature 5	4- wire trellis	800
D	Fuji	20	Mature >20	Free Standing	350
E	Fuji	20	Mature 10	Single-wire trellis	550
F	Fuji	20	Mature 5	4- wire trellis	800
G	Golden Delicious	40	Mature >30	Free Standing	200
H	Golden Delicious	10	Mature 7	Free Standing	400
I[1]	Red Delicious	25	Mature >30	Free Standing	200
J	Red Delicious	25	4	Free Standing	400
K	Honeycrisp	20	1	4-wire trellis	800
L	Peaches	55	Mature >12	Open Center	150
M	Peaches	10	Mature 5	Perpendicular V	300
N	Peaches	7	Mature > 12	Open Center	150
O	Nectarines	3	Mature 5	Perpendicular V	300

[1]All 25 acres of Red Delicious in Block I are leased property at a rate of $300 per acre.

Situation: 10-Year Analysis

- Unsustainable Business Model
- **45% of orchard blocks** generate a positive cash flow in most years
- **48% of orchard blocks** are currently or soon to be unprofitable
- **Net income declines** over the 10-years
- **Net worth declines** from $2.5m to $650k
- **Financial ratios and performance measures** run counter to a vibrant business prepared for the future
- Fearful of not having the ability to pass the business to Tim

Financial Information 01/01/2013

Beginning Cash on Hand		$ 50,000
Other Current Assets		$ 380,000
Market Value of Machinery and Equipment		$ 320,000
Market Value of Facilities & Other Improvements		$ 100,000
Market Value of Real Estate		$2,062,500
Total Assets	→	***$2,912,500***
Accounts Payable		$ 50,000
Value of Loans on Intermediate Loans	$ 75,968	
Value of Loans on Long-term Assets		$ 204,526
Total Liabilities	→	***$ 430,697***
Net Worth	→	***$2,461,903***

Year	Blk A, Gala >20 YOA	Blk B, Gala 10 YOA	Blk C, Gala 5 YOA	Blk D, Fuji > 20 YOA	Blk E, Fuji 10 YOA	Blk F, Fuji 5 YOA
1	$29,389	$84,634	$65,113	$27,419	$64,577	$171,117
2	$24,592	$77,402	$60,909	$21,613	$58,067	$161,480
3	-$52,366	-$60,547	-$27,859	-$68,393	-$61,340	-$51,087
4	$14,760	$62,577	$52,292	$9,713	$44,724	$141,725
5	$9,631	$54,845	$47,798	$3,506	$37,765	$131,423
6	$4,333	$46,857	$43,154	-$2,907	$30,575	$120,778
7	-$1,143	$38,600	$38,355	-$9,535	$23,143	$109,775
8	-$74,023	-$78,665	-$15,051	-$94,818	-$90,950	-$94,013
9	-$12,594	$21,336	$28,320	-$23,393	$7,605	$86,771
10	-$18,578	$12,314	$23,076	-$30,636	-$516	$74,749

Year	Blk G, G.Del >10 YOA	Blk H, G.Del 7 YOA	Blk I, R.Del >30 YOA	Blk J, R.Del 4 YOA	Blk K, Hcrisp, 1 YO	Blk L, Peach, >12 YOA
1	-$21,621	$2,641	-$31,910	-$2,806	-$275,323	$84,380
2	-$34,723	-$1,298	-$37,412	$8,894	-$41,598	$79,210
3	-$183,491	-$50,625	-$96,424	-$95,993	-$45,126	-$56,261
4	-$61,579	-$9,370	-$48,681	$9,552	$52,606	$68,613
5	-$75,586	-$13,580	-$54,558	$705	$246,727	$63,087
6	-$90,058	-$17,930	-$60,631	-$8,435	$285,692	$57,377
7	-$105,015	-$22,426	-$66,909	-$17,882	$276,268	$51,475
8	-$241,788	-$68,082	-$121,678	-$133,115	-$11,561	-$83,338
9	-$136,290	-$31,826	-$80,035	-$37,635	$216,575	$39,135
10	-$152,634	-$36,739	-$86,895	-$47,958	$206,278	$32,686

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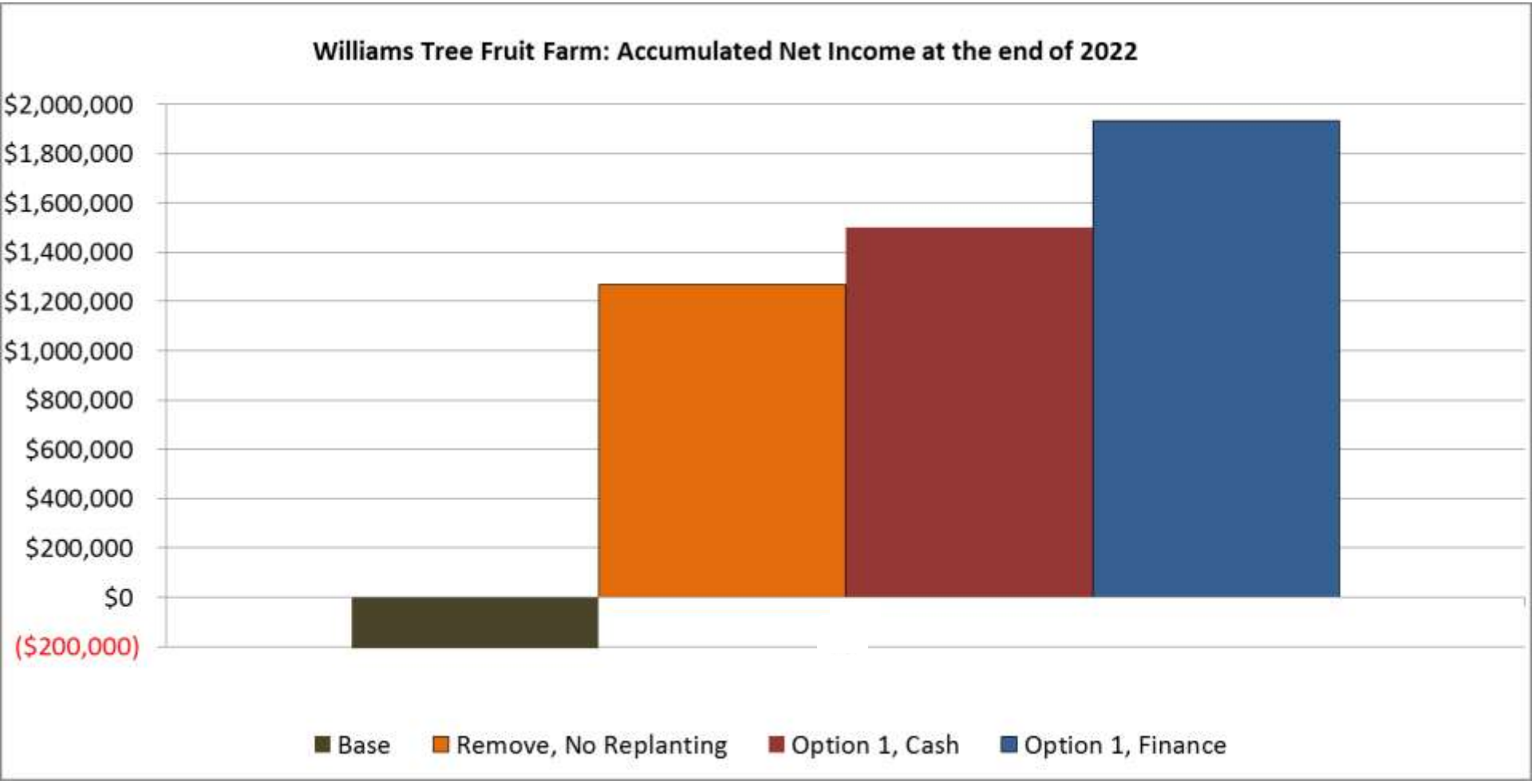
Year	Blk M, Peach, 5 YO	Blk N, Nect.,>12 YO	Blk O, Nect., 5 YO	Total
1	$33,476	$10,739	$10,043	$251,868
2	$32,412	$10,081	$9,724	$429,354
3	-$3,480	-$7,160	-$1,044	-$861,196
4	$30,232	$8,733	$9,069	$384,966
5	$29,094	$8,029	$8,728	$497,616
6	$27,919	$7,302	$8,376	$452,402
7	$26,705	$6,551	$8,011	$355,974
8	-$8,917	-$10,607	-$2,675	-$1,129,280
9	$24,166	$4,981	$7,250	$114,366
10	$22,839	$4,160	$6,852	$8,997

Year	Farm/Ranch Gross Income	Farm/Ranch Costs	Annual Net Income
1	$2,956,113	$2,778,344	$177,769
2	$3,013,475	$2,657,321	$356,154
3	$1,379,950	$2,313,434	-$933,484
4	$3,262,672	$2,956,458	$306,214
5	$3,565,505	$3,145,384	$420,121
6	$3,670,330	$3,294,805	$375,525
7	$3,670,215	$3,398,667	$271,548
8	$1,653,808	$2,867,539	-$1,213,731
9	$3,629,987	$3,600,014	$29,973
10	$3,629,862	$3,705,105	-$75,243

Possible Solutions

- **Remove Blocks G, H, I and J after the 2013 harvest** and replant in year 4 (2016) to a high-density apple system comparable to the Honeycrisp block.
- **Block I is a leased orchard**. This option also includes **developing an equitable crop-share lease** in which the landowner will pay for trees, trellising and irrigation system in the establishment year and Williams Tree Fruit Farm pays the annual production costs.
- **Blocks A and D are removed in 6 years** (2018) and renovated for three years. A high-density apple system planted in year 10.


Williams Tree Fruit Farm: Accumulated Net Income at the end of 2022
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
($200,000)
Base
Remove, No Replanting
Option 1, Cash
Option 1, Finance

	Beginning	Year 1	Year 2	Year 3	Year 4	Year 5
Assets						
Current Assets						
Cash balance:	$50,000	$56,602	$235,452	-$849,578	-$731,595	-$506,678
Prepaid expenses and supplies:	$20,000	$20,600	$21,218	$21,855	$22,510	$23,185
Products on hand or not sold:	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Invest in growing crops:	$50,000	$51,500	$53,045	$54,636	$56,275	$57,964
Accounts receivable:	$100,000	$103,000	$106,090	$109,273	$112,551	$115,927
Other current assets:	$10,000	$10,300	$10,609	$10,927	$11,255	$11,593
Intermediate Assets:						
Market value of equipment and breeding livestock:	$320,000	$307,883	$294,702	$340,430	$326,439	$311,302
Long term Assets:						
Market value of facilities and other improvements:	$100,000	$101,116	$102,123	$102,996	$103,682	$104,243
Market value of real estate:	$2,062,500	$2,062,500	$2,062,500	$2,062,500	$2,062,500	$2,062,500
Total Assets:	$2,912,500	$2,913,501	$3,085,740	$2,053,038	$2,163,617	$2,380,036
Liabilities						
Current Liabilities						
Accrued interest:	$0	$0	$0	$0	$0	$0
Accounts payable and accrued expenses:	$150,000	$154,500	$159,135	$163,909	$168,826	,891
Principal due over the next 12 months on term liabilities:		$49,568	$52,210	$44,803	$56,237	,348
Value of operating loans:		$0	$0	$0	$0	$0
Intermediate Liabilities						
Value of loans on intermediate assets:	$75,968	$57,250	$37,124	$25,689	$86,108	$62,850
Long Term Liabilities						
Value of loans on long term assets:	$204,628	$173,778	$141,694	$108,327	$73,624	$37,534
Total Liabilities:	$430,597	$435,097	$390,164	$342,727	$384,796	$333,623
Net Worth:	$2,481,903	$2,478,404	$2,695,576	$1,710,311	$1,778,821	$2,046,412

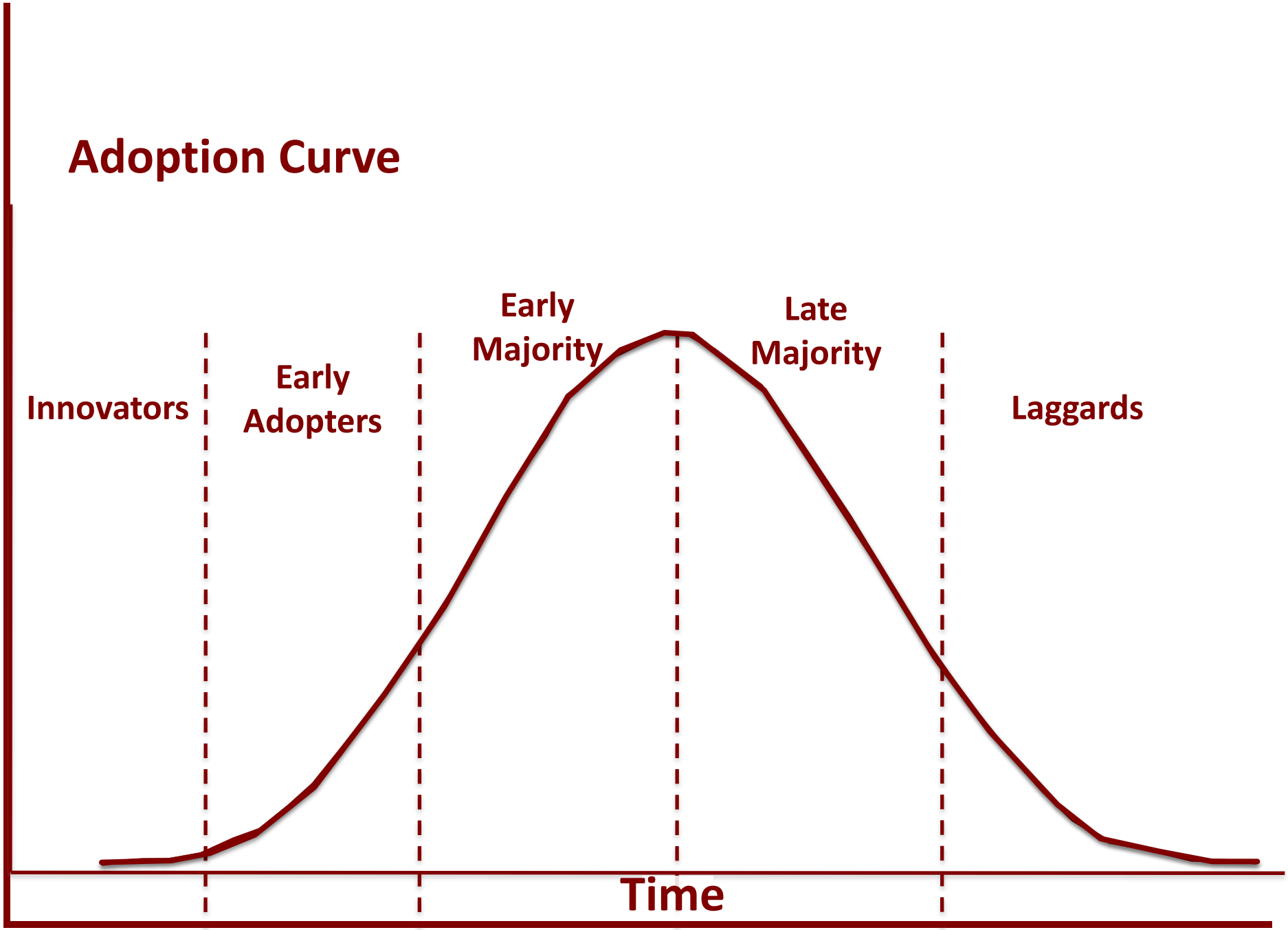
Year	Liquidity: Current Ratio	Liquidity: Quick Ratio	Liquidity: Working Capital ($)	Solvency: Debt/Asset Ratio	Solvency: Equity/Asset Ratio	Solvency: Debt/Equity Ratio
1	2.17	1.19	$237,934	14.93	85.07	17.54
2	2.96	2.02	$415,069	12.64	87.36	15.08
3	-2.17	-3.13	-$661,599	16.69	83.31	15.56
4	-1.46	-2.35	-$554,067	17.78	82.22	22.06
5	-0.42	-1.28	-$331,249	14.02	85.98	17.44
6	0.53	-0.35	-$107,778	10.44	89.56	12.58
7	1.06	0.12	$11,857	12.86	87.14	14.80
8	-5.26	-6.17	-$1,381,563	24.36	75.64	19.32
9	-5.73	-6.61	-$1,537,876	25.65	74.35	31.97
10	-6.63	-7.48	-$1,806,297	30.49	69.51	36.65

Year	Profitability: Rate of Return on Assets	Profitability: Rate of Return on Equity	Profitability: Operating Profit Margin	Profitability: Net Income
1	6.59	7.17	6.49	$177,769
2	12.25	13.77	12.20	$356,154
3	-35.99	-42.37	-67.02	-$933,484
4	15.14	17.55	9.78	$306,214
5	18.93	21.97	12.06	$420,121
6	15.11	16.90	10.41	$375,525
7	10.42	11.29	7.73	$271,548
8	-58.22	-70.45	-72.78	-$1,213,731
9	2.96	3.11	1.05	$29,973
10	-6.56	-9.81	-1.92	-$75,243

Year	Repayment Capacity: Capital Lease and Term Debt Coverage Ratio	Repayment Capacity: Capital Debt Repayment Capacity	Repayment Capacity: Capital Debt Repayment Margin
1	1.54	$97,968	$30,322
2	4.26	$270,957	$203,310
3	-19.17	-$1,024,225	-$1,081,665
4	3.14	$217,166	$143,984
5	4.70	$324,902	$250,944
6	5.00	$273,850	$214,298
7	4.22	$172,210	$126,667
8	-32.34	-$1,318,414	-$1,363,956
9	-1.97	-$80,299	-$125,842
10	-4.69	-$191,365	-$232,131

Year	Efficiency: Asset Turnover Ratio	Efficiency: Operating Expense Ratio	Efficiency: Depreciation Expense Ratio	Efficiency: Interest Expense Ratio	Efficiency: Net Income from Operations Ratio
1	101.48	91.81	1.70	0.48	6.01
2	100.46	86.08	1.72	0.38	11.82
3	53.71	163.14	3.88	0.63	-67.65
4	154.75	88.51	1.70	0.40	9.39
5	156.94	86.34	1.61	0.28	11.78
6	145.15	87.98	1.61	0.18	10.23
7	134.80	90.62	1.65	0.33	7.40
8	80.00	169.00	3.78	0.61	-73.39
9	282.80	97.18	1.77	0.22	0.83
10	342.06	100.09	1.83	0.16	-2.07

Adoption Curve



Initial Purchase Price, Hours of Total and Annual Use, Salvage Value and Operating Costs for DBR Harvester, Trailer, Platform, Self-Steering & Creeper Gear, and Tractor.

Parameters	Harvester[1,2]	Trailer[1,2]	Work Platform[1,2]	Self-Steering & Creeper Gear[1]	4-WD 55 Hp Tractor
Purchase Price	$71,500	$3,600	$12,400	$6,500	$35,000
Estimated Hours of Life	10,000	20,000	20,000	20,000	15,000
Years of Useful Life	20	25	25	25	15
Estimated Hours of Annual Use[3]	960	960	532	960	1,491
Estimated Hours of Annual Use[4]	489	489	532	489	1,020
Years of Useful Life Based on Farm Use[3]	10	21	38	21	10
Years of Useful Life Based on Farm Use[4]	20	41	38	41	15
Annual Repair Costs (3% of purchase price)[1]	$2,145	$108	$372	$195	$2,363
Salvage Value (30% of purchase price)[2]	$21,450	$1,080	$3,720	$-	$10,338
Fuel Use per Hour	n/a	n/a	n/a	n/a	4.0
Initial Cost per acre, based on 138 acres	$518.12	$26.09	$89.86	$47.10	$253.62
Salvage Value	$155.43	$7.83	$26.96	$-	$74.91
Operating Costs ($/hour):					
Repairs & Maintenance[3]	$2.23	$0.11	$0.69	$0.12	$1.58
Repairs & Maintenance[4]	$4.39	$0.22	na	$0.12	$1.62
Fuel & Lube ($4/gallon diesel fuel)	$-	$-	$-	$-	$16.56

[3]DBR Harvester used to harvest all fruit in tree canopy

[4]DBR Harvester used only to harvest fruit in the top one-third of the tree canopy, the lower two-thirds was first harvested from the ground using conventional methods.

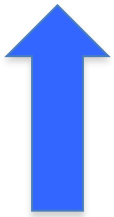
How many DBR harvesters are required to harvest the blocks on the Williams Tree Fruit Farm?

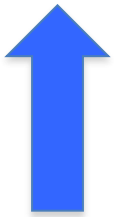
Two harvesters are required to cover the 138 acres within the harvest window under Option 1. The Gala and Fuji apple blocks cannot be harvested within their harvest window. It falls short by 506 total hours.

Parameters for Williams Tree Fruit Farm to Determine the Hours of Use for the Tractor, DBR Harvester, and Platform.

Crop	Start of Harvest	Days to Pick	Hours Available to Harvest	Acres to Pick	Harvesting All Fruit		
					Hours Required to Harvest	+/- hours	Hours of Annual Use Harvester
Stone Fruit	4th week of July	28	896	13	173	723	173
Gala	4th wk Aug	21	672	30	667	5	667
Honeycrisp	1st wk of Sept	10	320	20	76	244	76
Reds & Goldens	3rd wk of Sept	21	672	35	150	522	150
Fuji's	15th of Oct	14	448	40	400	48	400
Total			3,008	138	1,466		1,466

Total acres on farm	300
Percent of acreage machine is used on farm	46%
Machine hours per day	16
Number of Machines	2





How many DBR harvesters are required to harvest the blocks on the Williams Tree Fruit Farm?

However, under Option 2 (harvesting only the top one-third of the canopy) requires fewer hours which results in one DRB harvester harvesting the 138 acres.

Parameters for Williams Tree Fruit Farm to Determine the Hours of Use for the Tractor, DBR Harvester, and Platform.

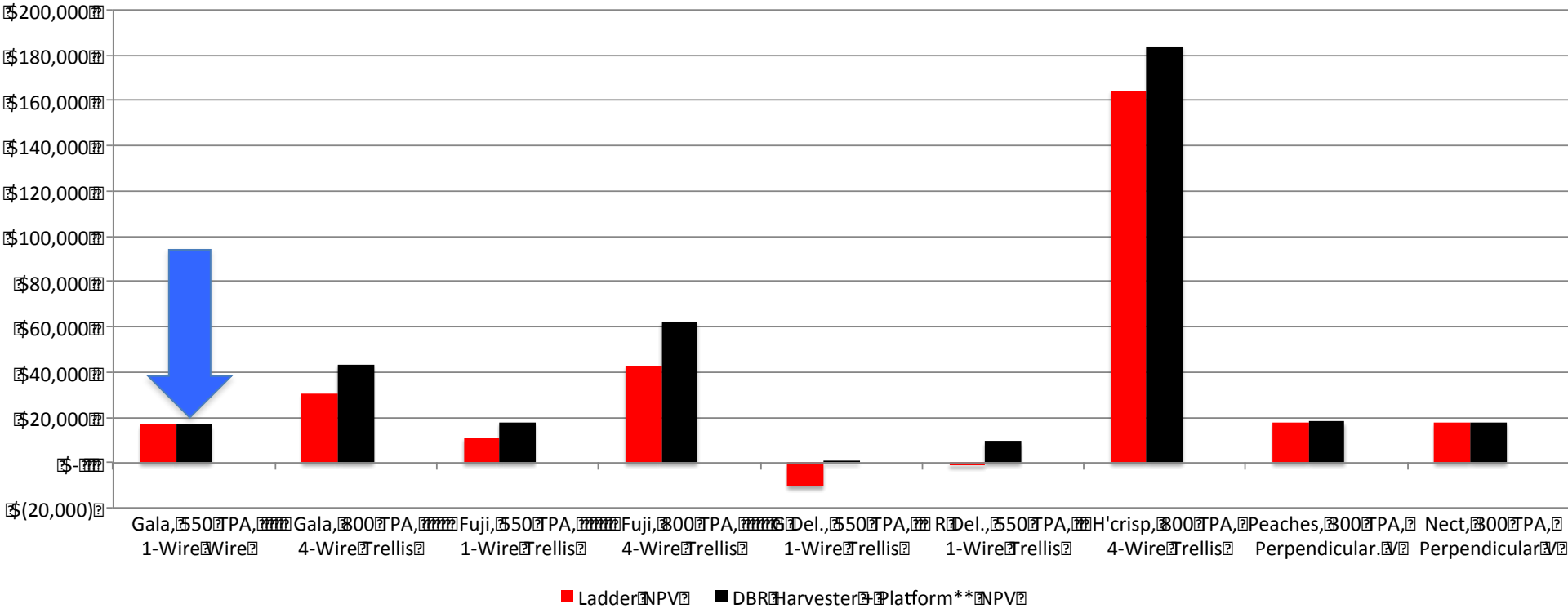
Crop	Start of Harvest	Days to Pick	Hours Available to Harvest	Acres to Pick	Harvesting All Fruit			Harvesting Top One-Third of Tree Canopy		
					Hours Required to Harvest	+/- hours	Hours of Annual Use Harvester	Hours Required to Harvest	+/- hours	Hours of Annual Use Harvester
Stone Fruit	4th week of July	28	448	13	173	275	173	58	390	58
Gala	4th wk Aug	21	336	30	667	-331	336	222	114	222
Honeycrisp	1st wk of Sept	10	160	20	76	84	76	25	135	25
Reds & Goldens	3rd wk of Sept	21	336	35	150	186	150	50	286	50
Fuji's	15th of Oct	14	224	40	400	-176	224	133	91	133
Total			1,504	138	1,466		960	489		489

Total acres on farm	800
Percent of acreage machine is used on farm	46%
Machine hours per day	16
Number of Machines	1

Profitability

Is the DBR harvester profitable under Option 1 in all study blocks at the Williams Tree Fruit Farm?

NO, Block B using Option 1 (harvesting all the fruit in the canopy) on the Williams Tree Fruit Farm has a net present value of -$62 per acre over the 10-year analysis than using ladders.



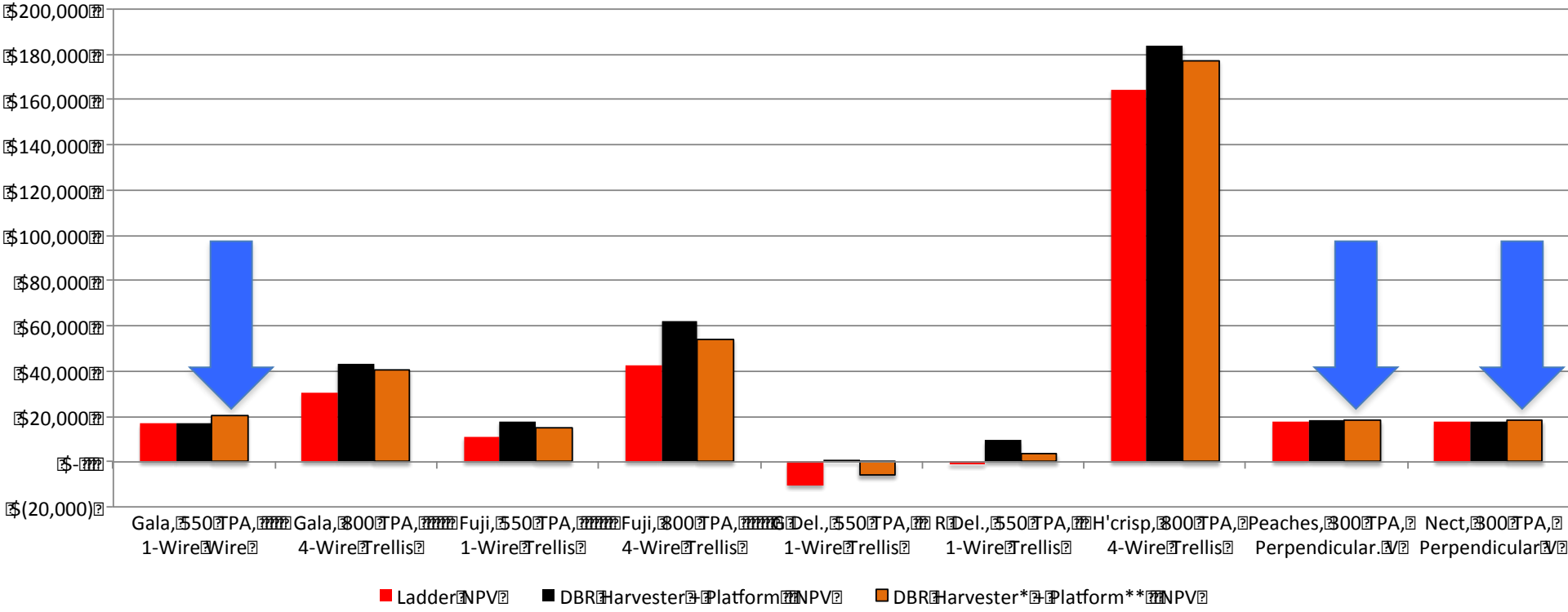
10-year net present value analysis; discount rate 8%

**An existing tractor was used on the farm with an additional 532 hours annually inserted in the costs of that tractor.

Profitability

Is Option 1 or Option 2 more profitable?

Depends on the system. The grower should use Option 2 (harvest fruit in the top third of the canopy only) on systems that are less efficient to harvest (Blocks B, Gala apples and Peaches and Nectarines), whereas the more efficient the system the more Option 1 (harvest all the fruit) should be used.



10-year net present value analysis; discount rate 8%

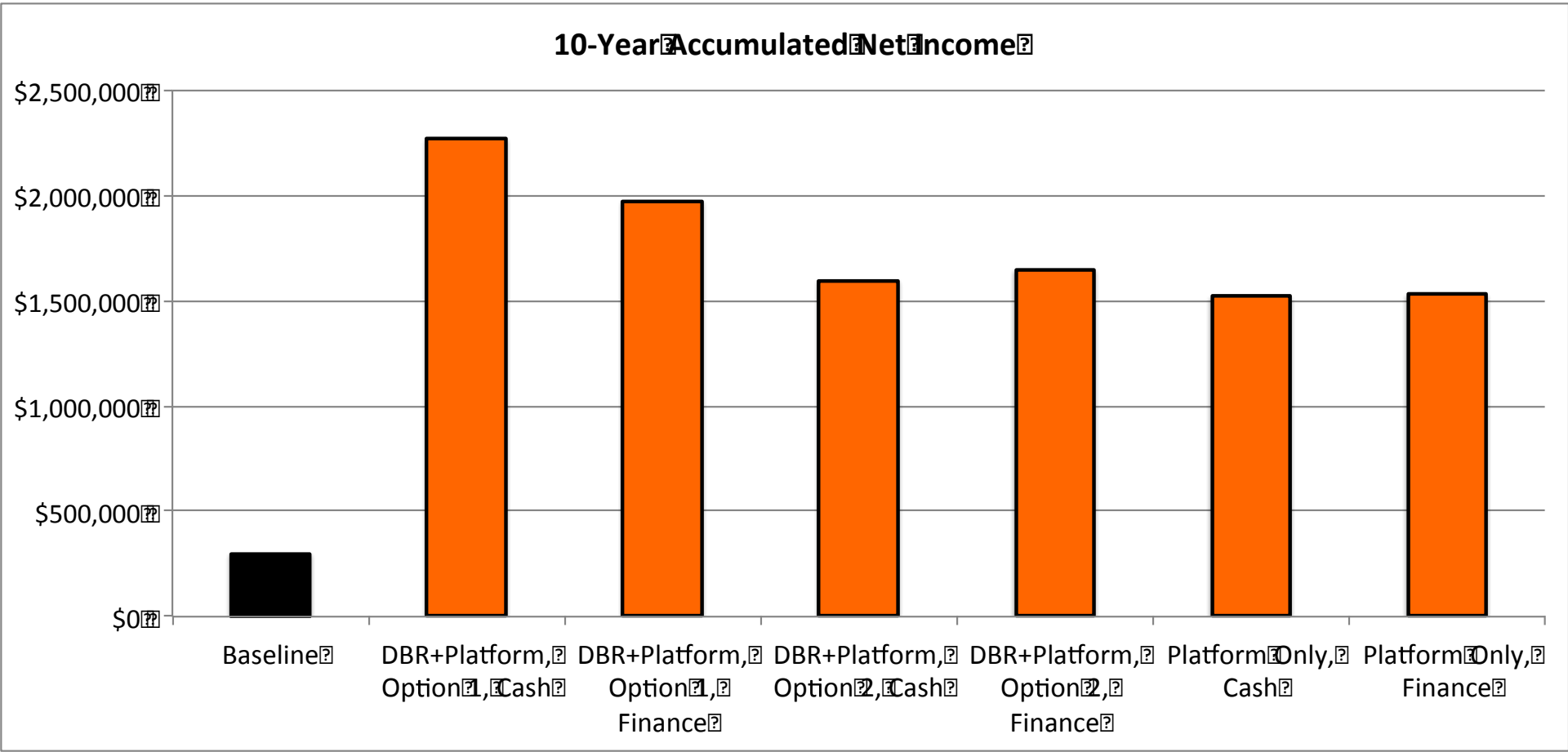
*DBR Harvester was used only to harvest fruit in the top one-third of the tree canopy.

**An existing tractor was used on the farm with an additional 532 hours annually inserted in the costs of that tractor.

Feasibility – Net Income

Is the DBR harvester feasible for the owner of the Williams Tree Fruit Farm?

Based on net income, yes, the accumulated net incomes are greater than the base operation using ladders, whether the grower decides to pay for the initial cost of the tractor, DBR machine, etc. from annual cash flows or finance the cost over 10-years at 6% interest.



Minimum Farm Size

What is the minimum farm size that would be able to afford this technology and stay within a reasonable annual net income, liquidity and solvency?

If the composition of orchard systems remained the same as a percentage of the total acreage the following happens:

1. **Williams Tree Fruit Farm: a 150-acre tree fruit grower similar to this operation could afford to finance this technology.**

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Questions or Comments?