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Buy, Lease, or Rent That New Reduced Tillage Grain Drill?

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BUY, LEASE, OR RENT THAT NEW REDUCED TILLAGE GRAIN DRILL?

By

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INTRODUCTION

A substantial number of Pacific Northwest grain producers are considering the adoption of a direct seed or low-till planting system. Among the numerous decisions associated with this adjustment is the choice of how to finance the new drill. Generally, producers have several financing options to consider and the economic payoff from selecting the optimal method is potentially worth thousands of dollars.

The objective of this paper is to provide a tool to analyze the drill financing decision by comparing the after-tax cash outflows associated with a debt-financed purchase, a long-term lease, and a short-term rent of a no-till (John Deere 750) and a minimum-till (John Deere 455) drill. The information on which the analysis is based was obtained from eastern Washington machinery dealers and financial institutions in mid-1998. Each producer's situation is unique and caution should be exercised in generalizing results to production situations different from those assumed for this bulletin (see Table 1). The following discussion initially focuses on a detailed analysis of a no-till drill, followed by analysis of a minimum-till drill.

NO-TILL DRILL

The first step in determining which of the three options is most attractive from a financial standpoint is to project the after-tax cash flows for each alternative (see Tables 2 and 3)[2]. Cash flows cover the five-year financing period and contain only those items varying between the three alternatives. The analysis was simplified without any loss of accuracy by excluding all common cost items for the no-till drill acquisition options such as labor, drill insurance, seed, fertilizer, and all costs related to the power unit (i.e., fuel, oil, repairs, depreciation, property taxes, interest, and insurance).

All three options provide savings in income and social security taxes associated with tax deductible expenses. Deductible expenses for the debt-financed purchase are interest on debt, depreciation, property taxes, and repairs. Lease and rental fees are also fully deductible. Tax savings are based on a 28 percent combined federal income and social security marginal tax rate.

Accelerated depreciation is assumed for the purchase option (Table 2). It was necessary to include property taxes and repairs in the purchase cash flow projection to make it comparable with leasing and renting. Recall that property taxes are not the producer's responsibility with

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[1]Respectively, the authors are Extension Economist, Department of Agricultural Economics; Area Agronomist and County Chair, Colfax; and Agronomist and County Chair, Dayton; Cooperative Extension, Washington State University.

[2]Custom-hire is a fourth alternative that may be available in selected regions. Under this arrangement, the producer hires the drill, power unit, and an operator.

Table 1. Basic assumptions used for analysis of financing options, no-till and minimum-till drills, 1998.

	Type of Drill	
	No-Till (15' with fert. placement)	Minimum-Till (35')
	– Debt Financed Purchase –	
Purchase price[1]	$53,750	$53,750
Down payment (30%)	$16,125	$16,125
Loan repayment period (yrs.)	5	5
Annual payments (10.15% int.)[2]	$9,963.44	$9,963.44
	– Long-Term Lease –	
Length of lease (yrs.)	5	5
Annual lease fee[3]	$11,854	$11,854
First payment due	Initiation of lease	Initiation of lease
Non-warranty repair responsibility	Producer	Producer
Property tax paid by	Lease company	Lease company
	– Short-Term Rent –	
Rental fee ($/acre)[4]	$14.00	$8.00
Annual acreage seeded	800	800
Non-warranty repair responsibility	Dealer	Dealer
Property tax paid by	Dealer	Dealer

[1]Includes 7 ½ % sales tax.
[2]First payment due in one year with five equal payments.
[3]Includes 7 ½ % sales tax.
[4]Fee due upon completion of seeding, 4% annual increase projected.

leasing or renting and since the rented drill is always under warranty, the producer has no repair expenses with that option. Annual property taxes are estimated to be $572 (1½% times the average investment [$\frac{\$53{,}750 new cost + \$22{,}500 salvage}{2}$]). Repair expenses are highly variable, but based on dealer experience are estimated to be $3,000 per year inflated at 2% annually (the average annual increase in farm machinery repairs for the U.S., 1993-1997).

Unlike the lease and rent options, the producer owns the drill at the end of five years when it is purchased. Thus, it is necessary to recognize a salvage value with this option. As indicated in

Table 2. Projected cash flow for the debt-financed purchase of a no-till drill.

Year	(1) Down Payment or Principal Payment $	(2) Interest @ 10.15% $	(3) Depreciation[1] $	(4) Property Taxes & Repairs $	(5) Tax Savings @ 28% MTR[2] $	(6) Salvage Value $	(7) After-Tax Cash Outflow[3] $
0	16,125	–	5,757	–	1,612	–	14,513
1	6,145	3,819	10,282	572[4]	4,108	–	6,428
2	6,768	3,195	8,079	3,572	4,157	–	9,378
3	7,455	2,508	6,584	3,632	3,563	–	10,032
4	8,212	1,752	6,584	3,693	3,368	–	10,289
5	9,045	918	6,584	3,756	(382)[5]	22,500	(8,399)
Total	53,750	12,192	43,870	15,225	16,426	22,500	42,241

[1]Modified accelerated cost recovery system, one-half year convention, no Section 179 expensing allowance. Depreciation is a non-cash expense and is included in the analysis solely for the purpose of identifying tax savings.
[2](Column 2 + column 3 + column 4) x 28% marginal tax rate.
[3]Column 1 + column 2 + column 4 - column 5 - column 6.
[4]Property tax only. Repairs covered by warranty.
[5]Includes taxes on depreciation recapture.

Table 3. Projected cash flow for the long-term lease and short-term rent of a no-till drill.

	Long-Term Lease				Short-Term Rent		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Lease Fee	Repairs	Savings @ 28% MTR[1]	After-Tax Cash Outflow[2]	Rental Fee @ $14/Acre[3]	Tax Savings @ 28% MTR[4]	After-Tax Cash Outflow[5]
Year	$	$	$	$	$	$	$
0	11,854	–	3,319	8,535	–	–	–
1	11,854	–	3,319	8,535	11,200	3,136	8,064
2	11,854	3,000	4,159	10,695	11,648	3,261	8,387
3	11,854	3,060	4,176	10,738	12,114	3,392	8,722
4	11,854	3,121	4,193	10,782	12,598	3,527	9,071
5	–	3,184	892	2,292	13,102	3,669	9,433
Total	59,270	12,365	20,058	51,577	60,662	16,985	43,677

[1](Column 1 + column 2) x 28% marginal tax rate.
[2]Column 1 + column 2 - column 3.
[3]800 acres x $14 per acre, inflated at 4% per year..
[4]Column 5 x 28% marginal tax rate.
[5]Column 5 - column 6.

Table 2, that salvage value, based on dealer estimates, is assumed to be $22,500. A tax of $3,534 on depreciation recapture must also be recognized ($22,500 salvage - $9,880 undepreciated basis x 0.28 marginal tax rate).

The relevant cash flows for the lease option include the annual $11,854 lease fee, repairs, and tax savings (Table 3, columns 1-4). Repair expenses are assumed the same as noted for the purchase option.

Rental cash flows include only the seasonal rental fee and the associated tax savings (Table 3, columns 5-7). The rental fee is based on $14 per acre (vendor estimates) and 800 acres of annual drill use, which translates to a first year rental cost of $11,200 (800 x $14). Since the rental fee must be renegotiated each year, the fee is likely to increase in step with the rise in price for a new drill. A four percent annual increase in the rental fee is assumed, a rate that reflects the average annual increase in U.S. farm machinery prices, 1991-1997.

The total after-tax cash outflow over the five-year period is $42,241 for the purchase (Table 2, column 7), compared to $51,577 for a long-term lease (Table 3, column 4), and $43,677 for the short-term rent (Table 3, column 7). There are, however, significant differences between the three financing alternatives in the timing of cash flows. The producer benefits when cash obligations occur at a later point in time because the producer gains use of the money and the associated earnings during the postponement period. For example, the net cash outflow at the end of year one is $20,941 with the purchase, $17,070 with the lease, and only $8,064 if the drill is rented. Relative to a purchase, the lease and rent options have an advantage in that a higher proportion of cash outflows occur at a later point in time. Allowances for differences in the timing of cash outflows can be made by computing the present value of cash outflows.

The procedure used to calculate the present values of after-tax cash outflows for each of the three financing alternatives is reported in Table 4. Selection of the interest rate used to discount future cash flows is an important part of this analysis. We assumed the producer can earn a pre-tax return of 10½ percent from the investment of money on hand; for example, by the retirement of debt carrying a 10½ percent interest rate. Assuming a 28 percent marginal tax rate, the 10½ percent converts to an after-tax rate of about 7½ percent [= 10 ½ x (1- 0.28)], the discount rate used to compute present values (see discount factors, Table 4, column 1). As reported in Table 4, the present value of the after-tax cash outflow is $38,536 for the purchase (column 3), $44,043 with a lease (column 5), and $35,142 if rented (column 7). Under the specific assumptions adopted for this analysis, renting the drill is the most financially attractive choice, saving $3,394 relative to the purchase and $8,901 compared to the lease.

Other Considerations

While renting appears to offer a clear financial advantage for the situation assumed, several risk considerations may affect the producer's final decision. One of these risks is the availability of a rental drill. The rental agreement is a seasonal one and there are no guarantees the drill will be available each year at an optimal seeding date. Additional sources of risk are variation in salvage value (purchase), interest rate, repairs, rental rate, and acres of annual drill use.

Table 4. Present value of after-tax cash outflows for selected no-till drill financing alternatives.

Year	(1) Discount Factor at 7 ½%[1]	Financing Alternatives: Debt-Financed Purchase (2) After-Tax Cash Outflow[2]	Debt-Financed Purchase (3) Present Value of After-Tax Cash Outflow[3]	Long-Term Lease (4) After-Tax Cash Outflow[4]	Long-Term Lease (5) Present Value of After-Tax Cash Outflow[5]	Short-Term Rent (6) After-Tax Cash Outflow[6]	Short-Term Rent (7) Present Value of After-Tax Cash Outflow[7]
		$	$	$	$	$	$
0	1.0000	14,513	14,513	8,535	8,535	–	–
1	0.9302	6,428	5,979	8,535	7,939	8,064	7,501
2	0.8653	9,378	8,115	10,695	9,254	8,387	7,257
3	0.8050	10,032	8,076	10,738	8,644	8,722	7,021
4	0.7488	10,289	7,704	10,782	8,074	9,071	6,792
5	0.6966	(8,399)	(5,851)	2,292	1,597	9,433	6,571
Total	–	42,241	38,536	51,577	44,043	43,677	35,142

[1]Equals $\frac{1}{(1.075)^n}$, where n = number of years.

[2]Table 2, column 7.

[3]Column 1 x column 2.

[4]Table 3, column 4.

[5] Column 1 x column 4.

[6]Table 3, column 7.

[7]Column 1 x column 6.

Financial comparisons are especially sensitive to changes in the rental rate and acres drilled annually. To illustrate, the analysis was repeated assuming a $15 per acre rental fee rather than the lease rate of $14 per acre (a common rate for the study area) and annual drill use ranging between 200 and 2,000 acres (Figure I). As expected, higher rental rates and larger acreage work to the disadvantage of renting. Relative to buying the drill, the breakeven annual acreage at the $15 and $14 per acre rental rates is 818 and 877 acres, respectively. Purchase is the best option above these breakeven levels and rent is best for smaller acreages.

MINIMUM-TILL DRILL

The same three financing options were analyzed for a minimum-till drill (John Deere 455). The options and their corresponding assumptions are shown in Table 1.

Cash flows for the purchase of a minimum-till drill appear in Table 5. Since the purchase price and financing for the minimum-till and no-till drills are the same, the cash flows are also similar. Exceptions include lower repair expenses and a higher salvage value for the minimum-till drill. Repairs are assumed to be $300 annually after year one, inflating at 2 percent annually each year thereafter. A $30,000 salvage value is assumed, compared to $22,500 for the no-till drill. The higher salvage value also results in a higher depreciation recapture and tax. The same procedures used to evaluate depreciation, tax savings, and depreciation recapture for the no-till drill were used with the minimum-till drill.

Lease and rent cash flows are projected in Table 6. The annual rental fee is based on 800 acres at $8 per acre, inflated at four percent each year for years two through five. The present value of after-tax cash flows for each of the three financing options is reported in Table 7, using, a 7½ percent after-tax interest rate to discount future dollars, as was calculated for the no-till drill.

The present value of after-tax cash flows is lowest for rent ($20,081), followed by the purchase ($28,544), with the lease ($37,813) the most expensive. Thus, the rental option holds an $8,463 and $17,732 advantage over the purchase and lease alternatives, respectively. The impact of a lower $6 per acre rental fee (also commonly available in the study area) and annual drill use ranging from 200 acres to 2,000 acres is summarized in Figure II. Note that at an $8 rental rate, the rental option is lowest cost up to 1,137 acres where the purchase becomes lowest cost for larger acreages. The break-even annual use for the rent and buy options is 1,487 acres, assuming a $6 per acre rental rate.

CONCLUSION

The primary objective of this bulletin was to help PNW grain producers analyze options for drill financing when considering the adoption of no-till and reduced tillage systems.

Under the single set of assumptions employed, three financing alternatives were analyzed for two popular reduced-tillage drills. Rental showed financial advantage, expressed as the present value of cash flows, over purchase or lease at the assumed yearly acreage, interest rates, marginal tax rate, and payment schedules. While the analysis was based on widely available financing terms, it is recognized that significant variation exists in these terms and small changes can have major

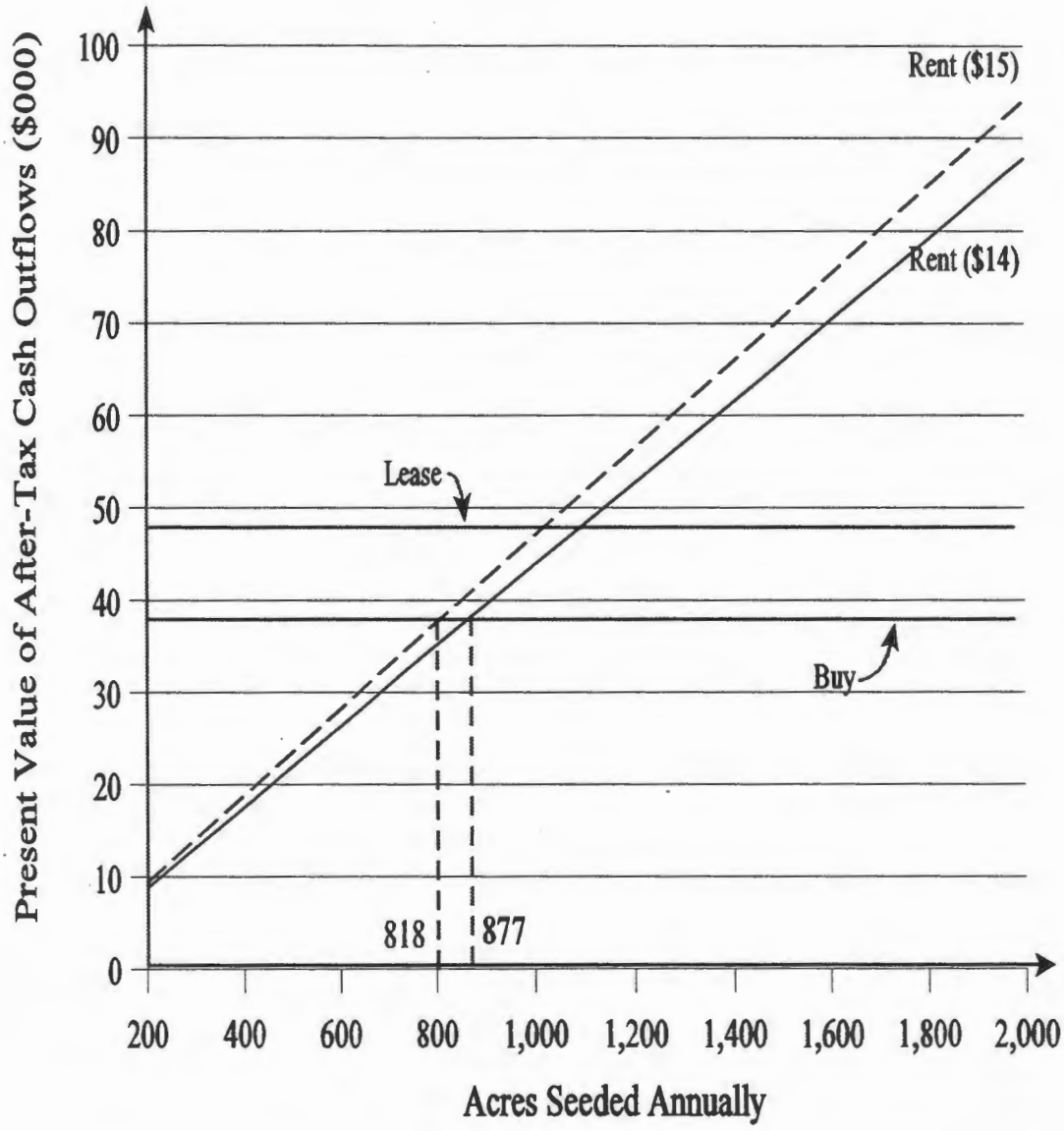

Figure I. Present value of five-year after-tax cash outflows associated with alternative methods of financing a no-till drill, selected acreage and rental rates.

Table 5. Projected cash flows for the debt-financed purchase of a minimum-till drill.

Year	(1) Downpayment or Principal Payment $	(2) Interest @ 10.15% $	(3) Depreciation[1] $	(4) Property Taxes and Repairs $	(5) Tax Savings @ 28% MTR[2] $	(6) Salvage Value $	(7) After-Tax Cash Outflow[3] $
0	16,125	–	5,757	–	1,612	–	14,513
1	6,145	3,819	10,282	572[4]	4,108	–	6,428
2	6,768	3,195	8,079	872	3,401	–	7,434
3	7,455	2,508	6,584	878	2,792	–	8,049
4	8,212	1,752	6,584	884	2,582	–	8,266
5	9,045	918	6,584	890	(3,284)[5]	30,000	(15,863)
Total	53,750	12,192	43,870	4,096	11,211	30,000	28,827

[1]Modified accelerated cost recovery system, one-half year convention, no Section 179 expensing allowance. Depreciation is a non-cash expense and is included in the analysis solely for the purpose of identifying tax savings.

[2](Column 2 + column 3 + column 4) x 28% marginal tax rate.

[3]Column 1 + column 2 + column 4 - column 5 - column 6.

[4]Property tax only. Repairs covered by warranty.

[5]Includes taxes on depreciation recapture.

Table 6. Projected cash flow for the long-term lease and short-term rent of a minimum-till drill.

	Long-Term Lease				Short-Term Rent		
	(1) Lease Fee	(2) Repairs	(3) Tax Savings @ 28% MTR[1]	(4) After-Tax Cash Outflow[2]	(5) Rental Fee @ $8/Acre[3]	(6) Tax Saving @ 28% MTR[4]	(7) After-Tax Cash Outflow[5]
Year	$	$	$	$	$	$	$
0	11,854	–	3,319	8,535	–	–	–
1	11,854	–	3,319	8,535	6,400	1,792	4,608
2	11,854	300	3,403	8,751	6,656	1,864	4,792
3	11,854	306	3,405	8,755	6,922	1,938	4,984
4	11,854	312	3,406	8,760	7,199	2,016	5,183
5	–	318	89	229	7,487	2,096	5,391
Total	59,270	1,236	16,941	43,565	34,664	9,706	24,958

[1](Column 1 + column 2) x 28% marginal tax rate.
[2]Column 1 + column 2 - column 3.
[3]800 acres x $8 per acre, inflated at 4% per year.
[4]Column 5 x 28% marginal tax rate.
[5]Column 5 - column 6.

Table 7. Present value of after-tax cash outflows for selected minimum-till drill financing alternatives.

Year	(1) Discount Factor at 7 ½%[1]	Financing Alternatives: Debt-Financed Purchase (2) After-Tax Cash Outflow[2]	Debt-Financed Purchase (3) Present Value of After-Tax Cash Outflow[3]	Long-Term Lease (4) After-Tax Cash Outflow[4]	Long-Term Lease (5) Present Value of After-Tax Cash Outflow[5]	Short-Term Rent (6) After-Tax Cash Outflow[6]	Short-Term Rent (7) Present Value of After-Tax Cash Outflow[7]
		$	$	$	$	$	$
0	1.0000	14,513	14,513	8,535	8,535	–	–
1	0.9302	6,428	5,979	8,535	7,939	4,608	4,286
2	0.8653	7,434	6,433	8,751	7,572	4,792	4,147
3	0.8050	8,049	6,479	8,755	7,048	4,984	4,012
4	0.7488	8,266	6,190	8,760	6,559	5,183	3,881
5	0.6966	(15,863)	(11,050)	229	160	5,391	3,755
Total	–	28,827	28,544	43,565	37,813	24,958	20,081

[1]Equals $\frac{1}{(1.075)^n}$, where n = number of years.

[2]Table 5, column 7.

[3]Column 1 x column 2.

[4]Table 6, column 4.

[5] Column 1 x column 4.

[6]Table 6, column 7.

[7]Column 1 x column 6.

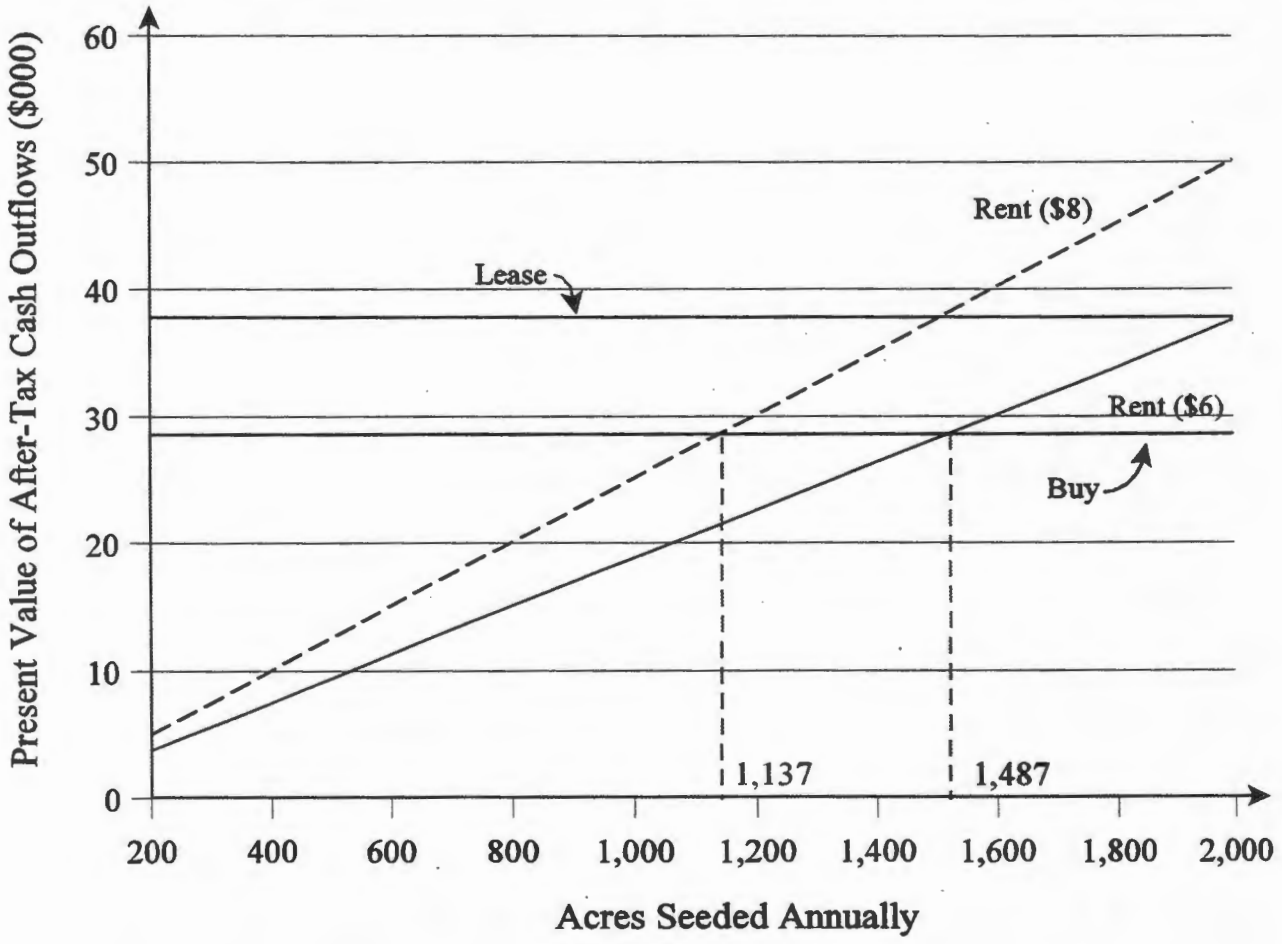

Figure II. Present value of the five-year after-tax cash outflows associated with alternative methods of financing a minimum-till drill, selected acreage and rental rates.

impact. Thus, producers and their advisors are cautioned against generalizing the results of this analysis. Instead, it is suggested that each producer pursue an analysis using assumptions that may be unique to his/her operation. If help is desired, an accountant, agricultural lender, or financial management professional should be consulted. A computer program for analyzing farm machinery financing alternatives is available from WSU. The DOS-based, compiled program and documentation can be ordered by writing the Bulletin Office, Washington State University, Department C, PO Box 645912, Pullman, WA 99164-5912. Request BUYORLEA (Version 2.0). Make check ($25) payable to WSU. The program can also be ordered from our website at http://farm.mngt.wsu.edu/.

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