

# Impact of Selected Financial Options on a Typical Cash Grain Farm in Central North Dakota

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Farms with high debt-to-asset ratios are experiencing serious cash shortfalls and deteriorating net worth positions under current economic conditions. Concern about the appropriate response to farm financial stress has created a significant dilemma for farmers, lenders, and policymakers. Numerous policy options have been considered, and some are now being implemented. Popular options being considered are debt moratoria, deferral of debt obligations, loan write-down, interest subsidies, expanded FmHA lending, secondary farm loan markets, and government guarantees.

Clearly, the second half of the 1980s is very important as far as the financial performance of farmers, the structure of agriculture, and agricultural policy are concerned. While the long-term prospects depend on improvements in price and income conditions for farmers, the near-term solution continues to emphasize financial management strategies and debt relief policies. The alternatives that farmers can employ on their own, together with government policies, will determine the prospects for survival and success of many farm businesses.

This study evaluates the financial consequences of three policy options that farmers might follow in response to financial stress.<sup>1</sup> The study compares these options to the effects of higher commodity prices or increased government subsidies and to the effects of lower commodity prices or decreased government subsidies. The analysis estimates the yearly cash flow, net income, and balance sheet statistics of a farm over a four-year period using the Farm Financial Simulation Model (FFSM) developed by Schnitkey et al. (1985). The three policy options evaluated are as follows: (1) sale of 35 percent of the assets with a lease-back plan, (2) a partial debt forgiveness, and (3) a reduction in interest rates.

## Farm Assumptions

The model farm is a typical cash grain farm in central North Dakota. Farm characteristics, production expenses, and liabilities are taken from the annual farm business summaries compiled under the North Dakota Vocational Agriculture Farm Business Management Program (Gullickson and Holkup, 1984 annual report). Records

from 36 cash grain farms for 1984 are used in developing the model farm.

The farm has 1,275 acres of land of which 1,075 acres are tillable. The major crops grown are wheat, sunflower, and barley. Approximately one-fourth of the tillable land is summer fallowed. Land fallowed the previous year is planted to wheat. The farm operator owns 513 acres of tillable land. The remaining 526 acres is rented on a basis of one-third to the landlord and two-thirds to the tenant. The landlord pays no production expenses except real estate taxes and one-third of the crop insurance on rented land.

Crop yields are held constant over the four-year period 1986-1989. Yields are based on a five-year (1980-1984) average in the central region of North Dakota (North Dakota Crop and Livestock Reporting Service 1985). Wheat and barley average yields are increased to reflect a yield trend to the midpoint year of the study (Ali and Johnson 1981). No trend is assumed in sunflower yield because sunflower yield has been constant for several years. The yields and 1986 direct crop expenses (Johnson et al. 1986) used for the model farm are presented in Table 1. No drying cost is included for wheat and barley. Drying cost for sunflower is 31 cents per hundredweight; half of the production is dried. Variable cost of storage, excluding interest charge, is 4 cents per bushel of wheat and barley and 12 cents per hundredweight of sunflower. Repair costs are not included in the individual crop expenses but are deducted with the unallocated costs.

Unallocated cash operating expenses total \$16,410. This includes \$2,265 for hired labor, \$7,940 for machinery repairs, \$690 for building and fence repairs, \$1,245 for utilities, \$1,370 for real estate tax, and \$2,900 for supplies and miscellaneous expenses. Family living expense is \$15,580 per year.

The farm operator participates in government programs so wheat base acreage is reduced from 25 to 30 percent and barley base acreage by 20 percent over the 1986-1989 period. Government payment calculations based on the Food Security Act of 1985 are shown in Table 2. Reductions in payments under the Gramm-Rudman Debt Reduction Act are not included.

Machinery investment, on the average, is \$54,650 for the farm or \$50.84 per tillable acre on a current market value basis. Depreciation on machinery is obtained from the farm records. Land is currently valued at \$348 per acre (Johnson 1986).

Half of the crop is marketed in the year produced with the remaining half marketed during the next calendar year.

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Therefore, one-half of wheat, barley, and sunflower production is included as beginning inventory on the balance sheet.

To examine the importance of debt-to-asset (D/A) ratios, three levels 20, 40 and 70 percent, are specified. Table 3 shows the beginning balance sheet values for each D/A ratio.

## Economic Scenarios

### Baseline Economic Scenario

Prices assumed over the four years were based on projections prepared by a group of Agricultural Economists from several midwestern states (Barry et al. 1985). The national price projections for 1986 through 1989 were adjusted to reflect the difference between the North Dakota price and

**Table 1. Crop Yields and Direct Crop Expenses Per Acre for Central North Dakota Cash Grain Farm, 1986.**

Item	Wheat on Fallow Land <sup>a</sup>	Wheat on Nonfallow Land	Barley	Sunflower
Yield per acre	31.5 bu.	26.7 bu.	44.4 bu.	10.4 cwt.
Direct expenses <sup>b</sup>				
Fuel and lube	\$ 6.53	\$ 5.13	\$ 5.72	\$ 5.70
Fertilizer	4.92	11.06	10.45	7.41
Herbicides	5.72	5.96	4.47	7.10
Insecticides	0.00	0.00	0.00	9.01
Seed	6.84	6.84	4.50	10.50
Custom work	2.77	1.26	0.12	0.22
Miscellaneous <sup>c</sup>	3.24	3.27	4.47	3.51
Total	\$30.12	\$33.52	\$29.73	\$43.65

<sup>a</sup>Includes the costs on an acre of summer fallow in addition to an acre of wheat.

<sup>b</sup>Excludes machinery repair, drying, and storage costs.

<sup>c</sup>Includes crop insurance and soil testing expense.

**Table 2. Payment Calculation for Participating in Government Programs.**

Item	1986	1987	1988	1989
<b>Wheat:</b>				
Base acreage	600	600	600	600
Planted (%)	75	72.5	70	70
Diversion (%)	22.5	27.5	30	30
Paid diversion (%)	2.5	—	—	—
ASCS yields (bu./ac.)	29.0	29.0	29.0	29.0
Paid diversion rate (\$/bu.)	1.10	—	—	—
Target price (\$/bu.)	4.38	4.38	4.29	4.16
Average price (\$/bu.)	2.47	2.39	2.27	2.27
Deficiency payment (\$/bu.)	1.91	1.99	2.02	1.89
Planted acres	450	435	420	420
Paid diversion	\$479	—	—	—
Deficiency payment	\$24,925	\$25,104	\$24,604	\$23,020
<b>Barley:</b>				
Base acreage	140	140	140	140
Planted (%)	80	80	80	80
Diversion (%)	17.5	20	20	20
Paid diversion (%)	2.5	—	—	—
ASCS yields (bu./ac.)	44.0	44.0	44.0	44.0
Paid diversion rate (\$/bu.)	0.57	—	—	—
Target price (\$/bu.)	2.60	2.60	2.54	2.47
Average price (\$/bu.)	1.67	1.62	1.64	1.64
Deficiency payment (\$/bu.)	0.93	0.98	0.90	0.83
Planted acres	112	112	112	112
Paid diversion	\$88	—	—	—
Deficiency payment	\$4,583	\$4,829	\$4,435	\$4,090

the national average price. Commodity prices, interest rates, and growth rates used are given in Table 4. The economic scenario in Table 4 hereafter will be referred to as the baseline scenario.

A summary of financial measures at the three D/A levels is given in Table 5. End-of-period net worth increased by 6 percent and 1 percent for the 20 and 40 percent D/A farms, respectively. In contrast, the 70 percent D/A farm showed a 34 percent decrease in net worth. If the 40 percent D/A farm liquidated, tax liabilities would cancel the modest gain in net worth over the four years. The debt-to-asset ratios excluding tax liabilities of liquidation for 20, 40, and 70 percent D/A farms ended the four years at 14 percent, 33 percent, and 80 percent, respectively. Ending year and average cash flow<sup>1</sup> were positive only for the 20 percent D/A farm. The negative cash flow for the 40 percent D/A farm could

be accommodated through refinancing. However, the large negative cash flow for the 70 percent D/A farm would likely require partial liquidation or debt relief. Ending debt-to-asset ratios excluding real estate for the 20 and 40 percent D/A farms were 0.14 and 0.46, while the 70 percent D/A farm showed an unacceptable ratio of 1.67 indicating severe cash problems. Average net income for the 20 and 40 percent D/A farms ranged from \$14,000 to \$20,000. However, the high interest costs reduced net income for the 70 percent D/A farm to only \$96 by 1989.

<sup>1</sup>Cash flow refers to cash available after paying all obligations including family living and principal payments. It is the sum of net income, depreciation, capital sales, injection (if any) minus family living, down payments, and principal payments.

**Table 3. Beginning Balance Sheets at Three Leverage Positions for Central North Dakota Cash Grain Farm, January 1986.**

Item	Debt-to-Asset Ratio		
	20%	40%	70%
	-----all farms-----		
<b>ASSETS</b>			
Current Assets			
Cash		\$ 11,402	
Marketable securities		9,130	
Inventories - grain		37,165	
Total Current Assets		57,697	
Intermediate Assets (machinery)		54,650	
Fixed Assets			
Building		14,670	
Land		215,476	
Total Fixed Assets		230,146	
Total Assets		342,493	
<b>LIABILITIES</b>			
Current Liabilities			
Current loans	\$ 9,194	\$ 20,734	\$ 38,043
Accounts payable	2,345	2,345	2,345
Accrued interest	278	627	1,150
Current part of inter. and long	5,164	10,327	18,073
Contingencies <sup>a</sup>	11,856	11,856	11,856
Total Current Liabilities	28,837	45,889	71,467
Intermediate loans	8,835	17,670	30,923
Long-term liabilities			
Long-term loans	42,960	85,921	150,362
Contingencies <sup>a</sup>	2,345	2,345	2,345
Total Long-term Liabilities	45,305	88,266	152,707
Total Liabilities	82,977	151,825	255,096
Net Worth With Contingencies	259,516	190,668	87,397
Net Worth Without Contingencies	273,716	204,868	101,597

<sup>a</sup>Contingencies represent the tax liability that would result from liquidation of the business. This amount must be subtracted from operators' net worth to determine the cash that could be withdrawn upon liquidation of the business.

**Table 4. Summary of Economic Variables Used in Central North Dakota Cash Grain Farm.**

Item	1986 <sup>a</sup>	1987	1988	1989
<b>Commodity prices (\$)</b>				
Wheat per bu.	2.61	2.53	2.40	2.40
Barley per bu.	1.67	1.62	1.64	1.64
Sunflower per cwt.	8.26	8.48	8.59	8.59
<b>Interest rates (%)</b>				
Short-term	12.10	12.30	12.30	12.50
Intermediate	12.10	12.30	12.30	12.50
Long-term	9.09	9.24	9.24	9.39
Marketable securities	6.80	7.50	8.40	8.70
<b>Growth rates (%)<sup>b</sup></b>				
Production expenses	XXXX	0.80	1.60	3.70
Overhead expenses	XXXX	0.80	1.60	3.70
Machinery	-18.72	-18.68	-18.63	-18.59
Buildings	-12.00	-12.00	-13.00	-14.00
Land	0.00	0.00	0.00	0.00

<sup>a</sup>Prices used for selling 1985 crops in 1986 were \$3.17 per bu. for wheat, \$2.07 per bu. for barley, and \$8.82 per cwt. for sunflower.

<sup>b</sup>Rates reflect the change in values from year to year. Depreciation is included in the changes for machinery and buildings.

### Pessimistic Economic Scenario

The pessimistic economic scenario represents either lower commodity prices or reduced government subsidies for wheat and barley. This scenario was implemented by reducing each year's gross farm income by 10 percent.

Net worth decreased for all D/A positions under this scenario. Net worth reduction over the four years from the baseline scenario was \$21,307, \$29,424, and \$38,722 for the 20, 40, and 70 percent D/A farms, respectively. Ending debt-to-asset ratio was slightly lower for the 20 percent D/A farm, marginally higher for the 40 percent D/A farm, and much higher for the 70 percent D/A farm. Average net income for the same D/A levels was \$14,888, \$8,922, and \$-4,082, respectively. Cash flow was negative even for the 20 percent D/A farm but was severely negative for the 40 and 70 percent D/A farms.

### Optimistic Economic Scenario

The optimistic scenario represents either higher commodity prices or increased government subsidies. This

scenario was incorporated by increasing gross farm income by 20 percent each year.

Net worth over a four-year period increased for the 20, 40, and 70 percent D/A farms as shown in Table 5. Net worth improvement from the baseline scenario was also large for all D/A levels. Average income for the 20, 40, and 70 percent D/A farms were \$30,137, \$26,772, and \$20,860, respectively. Average and ending cash flow were positive for all the D/A farms except that ending cash flow was negative for the 70 percent D/A farm. Average and ending year return on equity for the 20 and 40 percent D/A farms were more than 9 percent, and for the 70 percent D/A farm they averaged more than 19 percent.

### Policy Options

#### Sale with Lease-Back

One option a farmer may have is a conditional sale of land with the right to lease it on conventional terms. This strategy is implemented through asset sales by the farmer either to other investors, to the farmer's lenders, or to a government entity. The object is to relinquish ownership of some fixed assets to reduce debt but maintain asset control through leasing. Retiring a portion of the farm's indebtedness will reduce cash flow requirements under current rental-interest rate relationships.

This option involves the sale of 35 percent of total assets with a lease-back of the sold assets for the duration of the planning period. This plan was incorporated by selling 286 acres of land for \$96,679 and then leasing it back on a one-third to landlord crop share basis. Real estate tax was reduced from \$1,370 to \$725.

A summary of financial measures at the three D/A levels is given in Table 6. Net worth increased over the four-year period for the 20 and 40 percent D/A farms. However, liquidation would not be wise for the 20 percent D/A farm because its financial condition was worsened by the liquidation compared to the baseline scenario. The changes in net worth from the baseline scenario were \$-9,046, \$2,610, and \$38,099 for the 20, 40, and 70 percent D/A farms, respectively. This indicates that selling assets was a very good option for the 70 percent D/A farm. Ending debt-to-asset ratios were reduced for all D/A levels. Cash flows were positive for all D/A levels except the last year for the 70 percent D/A farm. Average and ending year net income were quite similar among the three original D/A situations. Ending year return on equity improved for all D/A levels but more so for the highest leveraged farm.

**Table 5. Summary of Financial Measures for Three Economic Scenarios at Three Leverage Positions.**

Item	20% Debt-to-Asset			40% Debt-to-Asset			70% Debt-to-Asset		
	Baseline Economic Scenario	Pessimistic Economic Scenario	Optimistic Economic Scenario	Baseline Economic Scenario	Pessimistic Economic Scenario	Optimistic Economic Scenario	Baseline Economic Scenario	Pessimistic Economic Scenario	Optimistic Economic Scenario
Beginning net worth	\$273,716	\$273,716	\$273,716	\$204,868	\$204,868	\$204,868	\$101,597	\$101,597	\$101,597
Ending net worth	293,130	271,823	332,823	208,498	179,074	250,475	62,463	23,741	123,501
Change in net worth	19,414	(1,893)	59,107	3,630	(25,794)	45,607	(39,134)	(77,856)	21,904
Tax upon liquidation	10,281	10,281	11,699	10,276	8,858	11,644	8,852	8,852	10,269
Average net income	20,214	14,888	30,137	16,278	8,922	26,772	5,801	(4,080)	20,860
Ending year net income	19,321	13,849	28,825	14,354	5,070	26,517	96	(11,655)	19,541
Average interest cost	5,569	5,608	5,569	11,437	12,563	10,842	23,507	25,508	20,212
Average cash flow	2,243	(3,084)	12,166	(4,786)	(12,779)	5,071	(20,101)	(31,375)	(6,435)
Ending year cash flow	1,281	(4,191)	10,785	(6,825)	(16,109)	5,339	(25,791)	(37,542)	(6,346)
Ending year debt-to-asset ratio									
Total	0.14	0.14	0.14	0.33	0.42	0.27	0.80	0.92	0.60
Excludes real estate	0.14	0.15	0.13	0.46	0.82	0.25	1.67	2.12	0.93
Average return on equity (%)	7.27	5.52	10.29	7.97	4.59	12.21	6.07	(7.21)	19.19
Ending year return on equity (%)	6.73	5.12	9.07	6.92	2.75	11.14	0.31	(22.64)	16.49

Note: Numbers in parentheses are negative.

**Table 6. Summary of Financial Measures for Three Policy Options at Three Leverage Positions Under the Baseline Economic Scenario.**

Item	20% Debt-to-Asset			40% Debt-to-Asset			70% Debt-to-Asset		
	Sale with Lease-Back	Debt Reductions	Interest Reductions	Sale with Lease-Back	Debt Reductions	Interest Reductions	Sale with Lease-Back	Debt Reductions	Interest Reductions
Beginning net worth	\$193,941	\$273,716	\$273,813	\$145,037	\$204,868	\$205,088	\$71,681	\$101,597	\$102,000
Ending net worth	204,368	310,580	299,091	151,277	245,845	221,313	70,646	137,144	95,725
Change in net worth	10,368	36,864	25,278	6,240	40,977	16,225	(1,035)	35,547	(6,275)
Change in net worth over baseline scenario	(9,046)	17,450	5,684	2,610	37,347	12,595	38,099	74,681	32,859
Cost of option	0	22,440	7,796	0	44,879	16,664	0	78,539	36,476
Tax upon liquidation	6,297	11,699	11,699	6,292	10,276	10,276	6,286	8,852	8,852
Average net income	17,983	18,967	21,860	16,940	14,395	19,426	15,135	4,636	13,816
Ending year net income	17,037	20,481	20,767	15,941	17,158	18,018	13,734	7,579	11,499
Average interest cost	1,729	3,889	3,620	3,161	8,127	7,271	6,039	16,812	14,388
Average cash flow	21,456	3,290	3,709	13,249	(2,081)	(1,637)	667	(13,036)	(11,886)
Ending year cash flow	2,152	3,945	2,727	1,073	(1,013)	(3,160)	(1,110)	(13,045)	(14,388)
Ending year debt-to-asset ratio									
Total	0.06	0.10	0.14	0.12	0.21	0.29	0.34	0.56	0.69
Excludes real estate	0.06	0.12	0.34	0.14	0.29	0.90	0.43	1.22	1.27
Average return on equity (%)	9.21	6.51	7.73	11.66	6.12	9.28	21.42	2.20	13.87
Ending year return on equity (%)	8.48	6.75	7.12	10.67	7.09	8.30	19.19	5.33	11.68

Note: Numbers in parentheses are negative.

### Reduction in Indebtedness

A reduction in indebtedness can be implemented through loan forgiveness by a lender or a principal write-down or buy-down that results from a specific governmental policy instrument. A 35 percent reduction in the farm's initial level of indebtedness was analyzed. The reduction of the initial debt levels was proportional across all debt categories. All debt forgiveness was treated as taxable income.

Net worth increased for all D/A ratios with the debt reduction option. The difference in ending net worth was close to the amount of debt reduced (Table 6). Ending debt-to-asset ratios improved to 10 percent, 21 percent, and 56 percent for the 20, 40, and 70 percent D/A farms, respectively. Average and ending year net income for each D/A situation was not much different from the situation before debt reduction. The 40 and 70 percent D/A farms showed improvements in their returns to equity over the baseline scenario. Average and ending cash flow were positive only for the 20 percent D/A farm. The cash flow deficit for the 70 percent D/A farm was still large and resulted in a debt-to-asset ratio (excluding real estate) over one.

### Reduction in Interest Rate

Lower interest rates paid on indebtedness could result from government subsidy, legislation, or a general decline in interest rate due to monetary financial policy. The magnitude of the reduction analyzed was 35 percent. Short- and intermediate-term interest rates would be reduced from just more than 12 percent (Table 4) to approximately 8 percent while long-term interest rates would be reduced from just more than 9 percent to about 6 percent.

The effect of reduced interest rates is similar to public credit programs that allow the substitution of public credit at concessionary interest rates for credit from commercial sources at market rates. The average interest payment reduction was \$7,796, \$16,664, and \$36,476 for the 20, 40, and 70 percent D/A farms, respectively.

Net worth increased for the 20 and 40 percent D/A farms with the interest reduction option (Table 6). The changes in net worth over the baseline scenario were modest for the 20 and 40 percent D/A farms (\$5,864 and \$12,595, respectively) but large for the 70 percent D/A farm (\$32,859). Average and ending year net incomes for all D/A farms im-

proved considerably over the baseline situation. Average and ending year cash flow were positive for the 20 percent D/A farm, slightly negative for the 40 percent D/A farm, and more than \$10,000 negative for the 70 percent D/A farm. Average and ending year return on equity for the 20, 40, and 70 percent D/A farms all increased over the baseline situation and were intermediate between the sale with lease-back option and the debt reduction option.

### Summary and Conclusions

A policy option should be evaluated in terms of what it will return to the farmer in relation to its cost. The policies of interest to the farmer are higher commodity prices (optimistic scenario), sale of assets with a lease-back plan, debt reduction, and interest rate reduction.

The farmer with the 20 percent debt-to-asset ratio does not have serious financial problems. A policy change would be of interest to that farmer if participation would be advantageous. The optimistic scenario would be advantageous to all farms but would have significantly differing impacts for different financial positions. The optimistic scenario would result in \$62,000 increased income for all farms. However, after taxes and other considerations the net worth of the 20 percent D/A farm would improve by \$39,700. The 20 percent D/A farm would not receive commensurate benefits to the costs of any of the options. The sale with lease-back option improves the debt-to-asset ratio of all farms, but the actual change in ending net worth for the 20 percent D/A farm is \$9,000 less than the baseline scenario. This option also would result in the loss of the control of the land sold. The debt reduction option costs the government or lending institution \$22,440. The change in ending net worth to the 20 percent D/A farm is only \$17,450. Therefore, it would not be recommended as a general economic policy. For the 20 percent D/A farm an interest rate reduction option would increase ending net worth by 73 percent per dollar of cost. Debt reduction fares slightly better at 78 cents per dollar of cost.

The 40 percent D/A farm nets a \$42,000 higher return from the optimistic scenario than the baseline. The 35 percent sale with lease-back option increases the ending net worth; however, the decrease in the amount of land owned should be considered. The \$2,600 increase in ending net worth may not compensate the loss of land ownership. The

debt and interest rate reduction options produce results similar to the 20 percent D/A farm; the return is not as large as the expenditure required. The 40 percent D/A farm with significant cash flow problems may want to consider a sale with lease-back option.

The 70 percent D/A farm would receive almost a dollar for dollar increase in ending net worth from an optimistic scenario because this class of farms does not pay income taxes. The debt and interest rate reduction options both provide almost dollar for dollar returns to the option. The debt reduction option is preferred over the interest reduction option because a \$36,500 cost in interest reduction reduces the debt-to-asset ratio only to 69 percent and still leaves the farm with a heavier long-term problem. The \$78,540 cost of debt reduction results in a 56 percent D/A situation at the end of four years. This is slightly better than the 60 percent final debt-to-asset situation resulting from the optimistic scenario. The debt reduction policy yields the greatest benefit to the 70 percent D/A farm because the ending debt-to-asset ratio is low enough to provide the farm an opportunity to continue over the longer run. In the absence of government intervention, the sale with a lease-back plan is the only viable option for the 70 percent D/A farm. A debt reduction negotiated with lenders would help, but probably would be only a preliminary step before partial liquidation.

Because each farm financial structure differs, the best course of action also differs. The significant implication of this study is that the 70 percent D/A farm still appears to have viable options for staying in business.

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